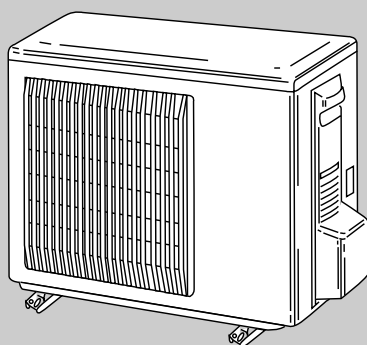
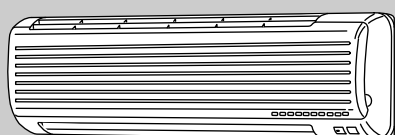


# SERVICE MANUAL

## Wireless type Models

**MSZ-A09RV** - **E1** (WH) • **MUZ-A09RV** - **E1**  
**MSZ-A12RV** - **E1** (WH) • **MUZ-A12RV** - **E1**



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### Revision:

- A number of drainage holes of MUZ-A09RV-**E1** and MUZ-A12RV-**E1** has been increased.
- Compressors of MUZ-A09RV-**E1** and MUZ-A12RV-**E1** has been changed.(SNB092FBA → SNB092FJAH)
- SPECIFICATION, OUTLINES AND DIMENSIONS and PARTS LIST have been partially modified.
- Please void OB230.

# 1 TECHNICAL CHANGES

## INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts R410A of HFC refrigerant which never destroys the ozone layer.

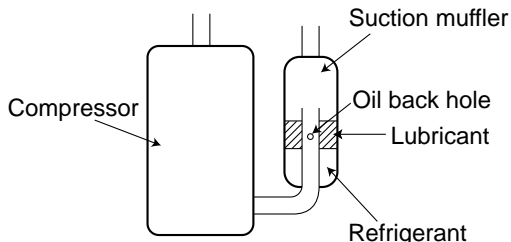
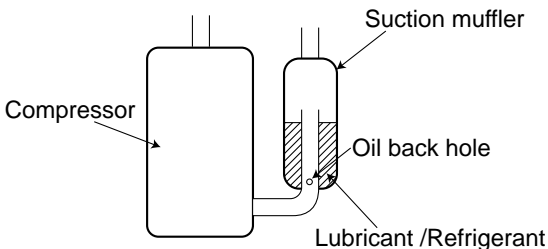
Pay attention following points.

- As R410A working pressure is 1.6 times higher than that of R22 of previous refrigerant, dedicated tools and piping are required.
- R410A is more affected by water and contaminations than R22. Keep R410A away from water and contaminations during storage and while installing.
- Use clean dedicated piping materials for R410A only which are strong enough against R410A pressure. Never use any current pipes designed for R22.
- Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (°C)	-51.4	-40.8
	Steam pressure [25°C](Mpa)	1.557	0.94
	Saturated steam density [25°C](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP *1	0	0.055
	GWP *2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Lubricant	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

\*1 :Ozone Destruction Parameter : based on CFC-11

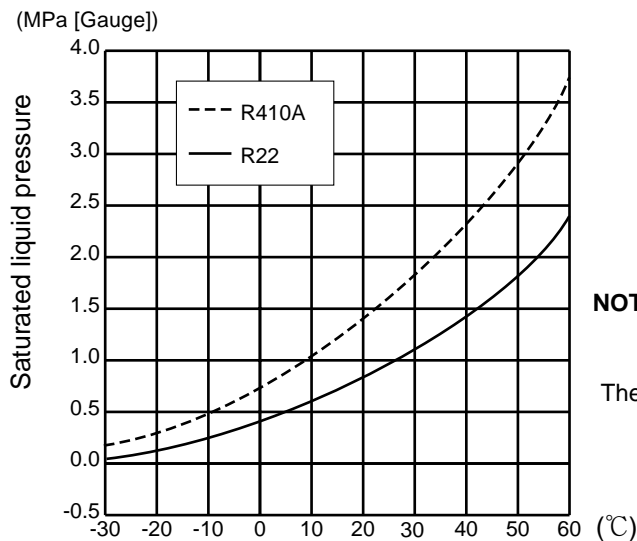
\*2 :Global Warmth Parameter : based on CO<sub>2</sub>

	New Specification	Current Specification
Compressor	<p>The incompatible lubricant easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the lubricant of the upper layer to the compressor.</p> 	<p>Since refrigerant and lubricant are compatible each, lubricant backs to the compressor through the lower position oil back hole.</p> 

**NOTE** : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/cm² [Gauge])**

## Conversion chart of refrigerant temperature and pressure



**NOTE :** The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/cm<sup>2</sup> [Gauge])**

### 1.Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.

The diameter of the service port on the outdoor unit operation valve has been changed to prevent improper refrigerant charging. Cap size has also been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A pressures beyonds the measurement range of R22 gauges. Port diameters have been changed to prevent other kinds of refrigerant from being charged into the units.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	1/4 and 3/8 wrenches can be used for both R22 and R410A units.
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	Newly required	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	Newly required	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	Newly required	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No : Not Substitutable for R410A    Yes : Substitutable for R410A

### 2.Refrigerant piping

#### ① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter		Wall thickness	Insulation material
	mm	inch		
For liquid	6.35	1/4	0.8 mm	Heat resisting foam plastic
For gas	9.52	3/8	0.8 mm	Specific gravity 0.045 Thickness 8 mm

- Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.7 mm or less, as the pressure resistance is in sufficient.

#### ② Flaring work and flare nut

Flaring work for R410A pipes differs from that for the existing refrigerant pipes.

For details of flaring work, refer to Installation manual "6-1 FLARING WORK".

### ③ Optional extension pipe for R410A

3m ( $\phi 6.35/\phi 9.52$ )	MAC-A00PI
5m ( $\phi 6.35/\phi 9.52$ )	MAC-A01PI
7m ( $\phi 6.35/\phi 9.52$ )	MAC-A02PI
10m ( $\phi 6.35/\phi 9.52$ )	MAC-A03PI
12m ( $\phi 6.35/\phi 9.52$ )	MAC-A04PI

### 3.Refrigerant oil

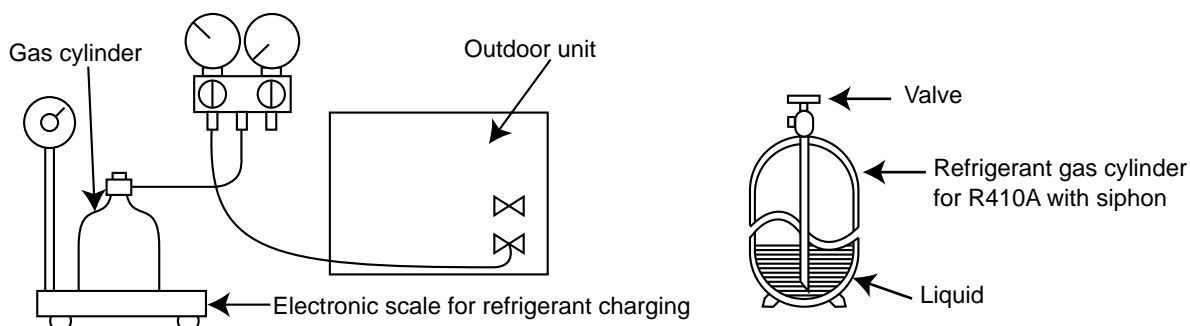
Apply the special refrigeration oil (accessories) to the flare and the union seat surfaces.

### 4.Air purge

Use the vacuum pump for air purging for the purpose of environmental protection.

### 5.Additional charge

For additional charging, charge the refrigerant from liquid phase of the gas cylinder. If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.

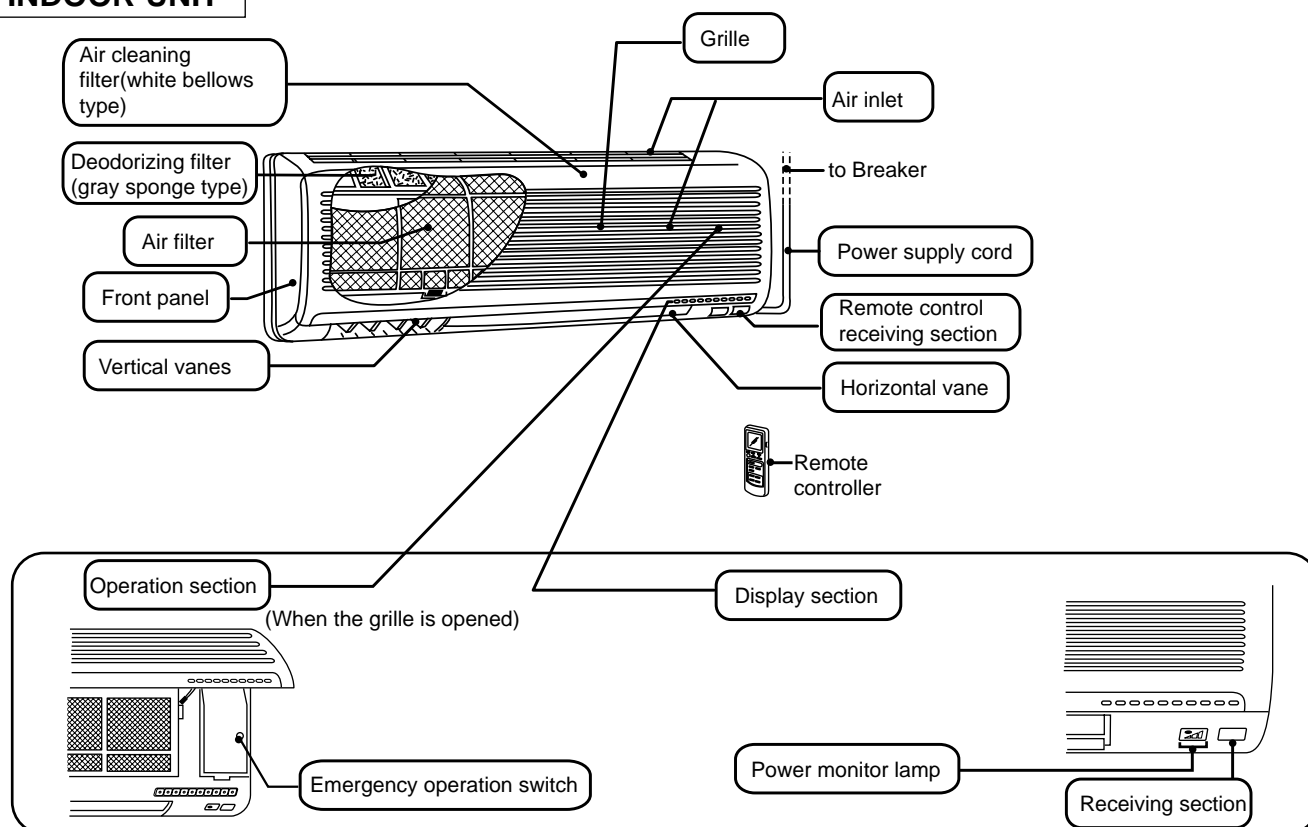


## 2 PART NAMES AND FUNCTIONS

MSZ-A09RV-E1

MSZ-A12RV-E1

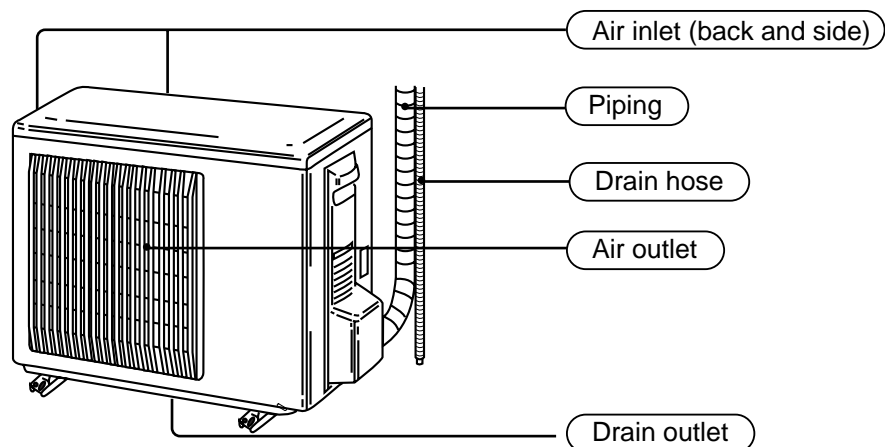
### INDOOR UNIT



MUZ-A09RV-<sup>[E1]</sup>

MUZ-A12RV-<sup>[E1]</sup>

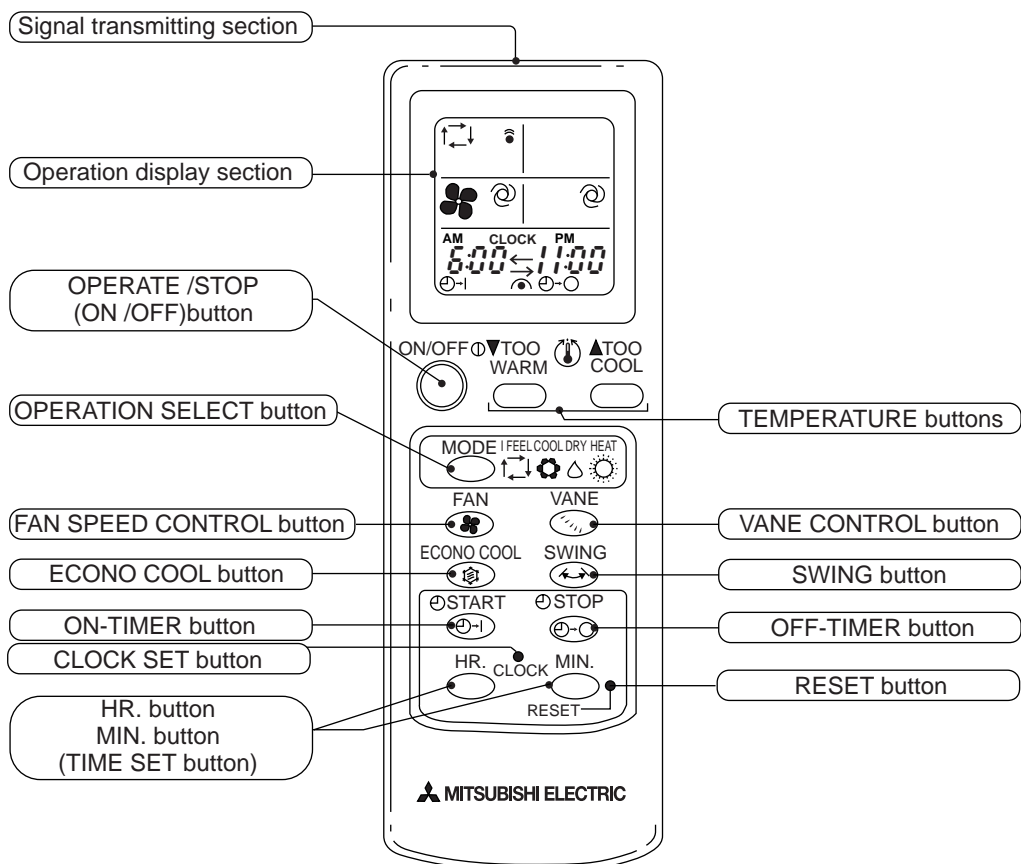
## OUTDOOR UNIT



MSZ-A09RV-<sup>[E1]</sup>

MSZ-A12RV-<sup>[E1]</sup>

## REMOTE CONTROLLER



Indoor model			MSZ-A09RV - <div>E1</div>		MSZ-A12RV - <div>E1</div>	
Function			Cooling	Heating	Cooling	Heating
Power supply			Single phase 220-240V,50Hz		Single phase 220-240V,50Hz	
Capacity	Capacity	kW	2.6 (0.9-3.3)	3.6 (0.9-4.8)	3.4 (0.9-3.8)	4.8 (0.9-6.1)
	Air flow(High)	m³ /h	516	540	588	642
	Dehumidification	ℓ /h	1.2	—	1.6	—
Electrical data	Power outlet	A	10		10	
	Running current	A	3.67-3.37	4.55-4.17	5.60 - 5.13	7.25 - 6.65
	Power input	W	800 (250-1180)	990 (250-1650)	1220 (250 - 1580)	1580 (250 - 2050)
	Auxiliary heater	A(kW)	—		—	
	Power factor	%	99		99	
	Starting current	A	4.55 - 4.17		7.25 - 6.65	
	Fan motor current	A	0.17		0.19	
Fan motor	Model		RC4V19-BA		RC4V19-BA	
	Winding resistance(at20℃)	Ω	WHT-BLK 292.4 BLK-RED 324.6		WHT-BLK 292.4 BLK-RED 324.6	
	Dimensions W×H×D	mm	850×278×191		850×278×191	
Weight		kg	10		10	
Air direction			5		5	
Special remarks	Sound level (High)	dB	36	35	39	39
	Fan speed (High)	rpm	920	950	1020	1100
	Fan speed regulator		3		3	
	Thermistor	RT11(at25℃)	kΩ	10	10	10
		RT12(at25℃)	kΩ	10	10	10
		RT13(at25℃)	kΩ	10	10	10
Outdoor model			MUZ-A09RV - <div>E1</div>		MUZ-A12RV - <div>E1</div>	
Capacity	Outdoor air flow	m³ /h	1440	1530	1440	1530
Electrical data	Compressor motor current	A	6.9	7.4	7.4	8.1
	Fan motor current	A	0.27-0.25		0.27-0.25	
Coefficient of performance(C.O.P)			3.25	3.64	2.79	3.04
Compressor	Model		SNB092FJAH		SNB092FJAH	
	Output	W	700		900	
	Winding resistance(at20℃)	Ω	U-V 0.93    U-W 0.93 V-W 0.93		U-V 0.93    U-W 0.93 V-W 0.93	
Fan motor	Model		RA6V28-CA		RA6V28-CA	
	Winding resistance(at20℃)	Ω	WHT-BLK 197 BLK-RED 315   YLW-BLK 13		WHT-BLK 197 BLK-RED 315   YLW-BLK 13	
Dimensions W×H×D		mm	710(+69)×540×255		710(+69)×540×255	
Weight		kg	34		34	
Special remarks	Sound level	dB	45	47	46	48
	Fan speed	rpm	670	700	670	700
	Fan speed regulator		2		2	
	Refrigerant filling capacity(R410A)	kg	1.10		1.10	
	Refrigerating oil (Model)		450 (NEO22)		450 (NEO22)	
	Thermistor	RT61(at100℃)	kΩ	13.4	13.4	13.4
		RT62(at0℃)	kΩ	32.6	32.6	32.6
		RT64(at50℃)	kΩ	17	17	17

NOTE : Test conditions.

Cooling : Indoor DB27°C WB19°C

Outdoor DB35°C WB24°C

Heating : Indoor DB 20°C WB -°C

Outdoor DB 7°C WB 6°C

## Specifications and rating conditions of main electric parts

### INDOOR UNIT

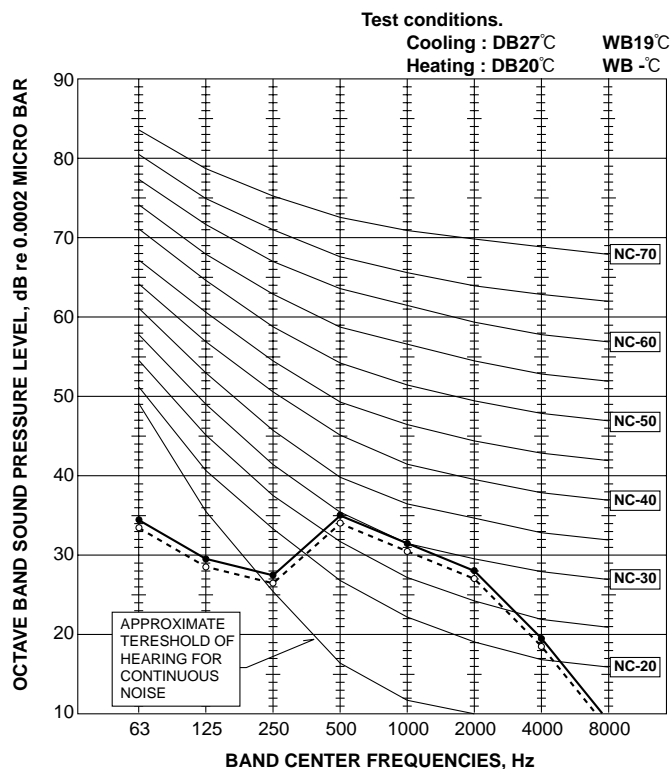
Item	Model	MSZ-A09RV MSZ-A12RV
Indoor fan capacitor		1.5 $\mu$ F 440V
Vane motor		MP24GA 12V 300 $\Omega$
Varistor (NR11)		ERZV10D471
Semiconductor relay		S201DH1Y
Terminal block		4P
Relay (compressor) (52C)		JM1aN-ZTMP-DC12V
Terminal block thermal Fuse		93.5°C 5A 250V
Indoor fan motor thermal fuse		136°C $\pm$ 3°C 2A
Fuse (F11)		250V 3.15A

### OUTDOOR UNIT

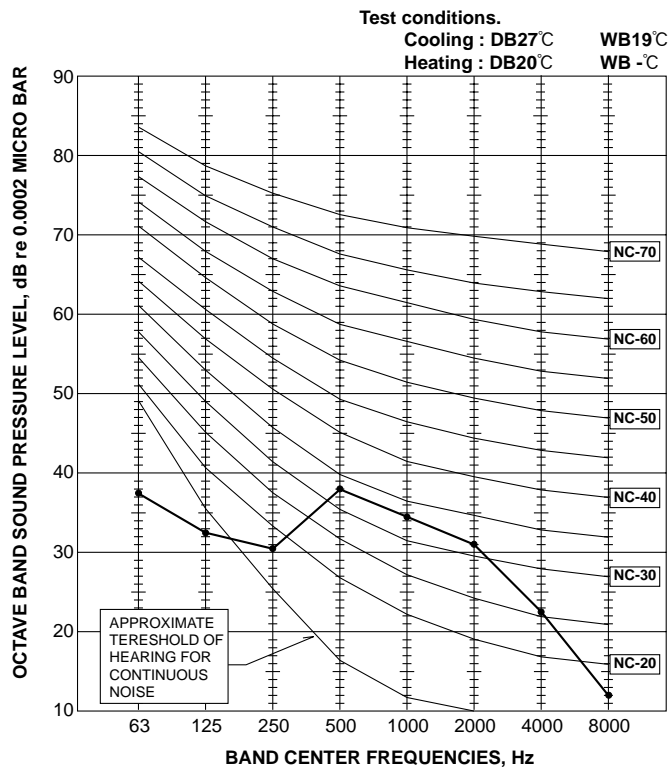
Item	Model	MUZ-A09RV MUZ-A12RV
Smoothing capacitor (C61,C62)		500 $\mu$ F 450V
Outdoor fan capacitor (C65)		1.8 $\mu$ F 440V
Current transformer (CT61)		RR-18
Fuse (F801, F901)		250V 2A
Reactor (L64)		13A 1.0mH
Noise filter		EM43240
Current detecting resistor (R61, 62, 64)		50m $\Omega$ 5W
Current limiting resistor (R65)		100 $\Omega$ 20W
Terminal block		4P
Intelligent power module		PS21101-AL / PS21204-A
Relay (X61)		G4U-1-E
Relay (X62)		G4U-1-E
R.V. coil		LB6 250V AC
Power factor controll module		PMA10001
Rush current limiting relay		G4A-1A-P-PS

MSZ-A09RV-<sup>[E1]</sup>

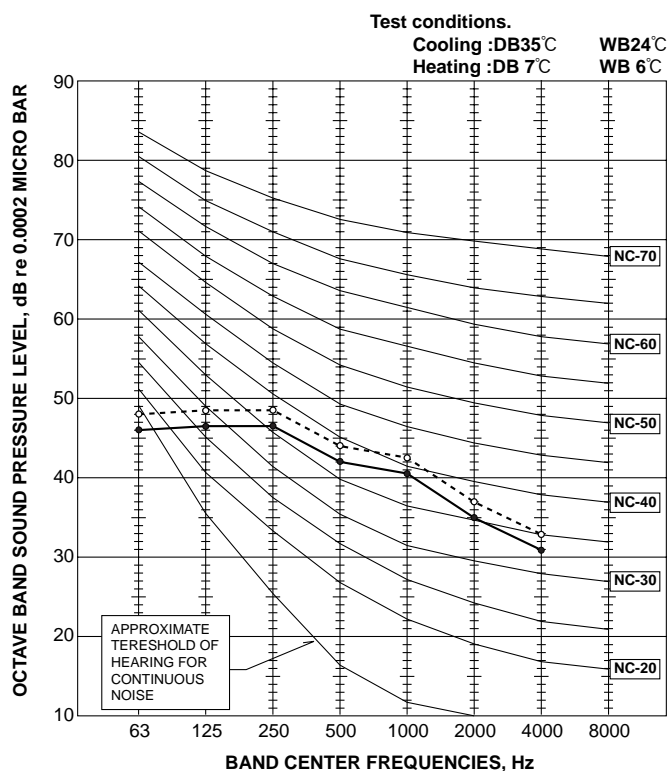
NOTCH	SPL(dB(A))	LINE
HEATING	35	○- - - -○
COOLING	36	●- - - -●

MSZ-A12RV-<sup>[E1]</sup>

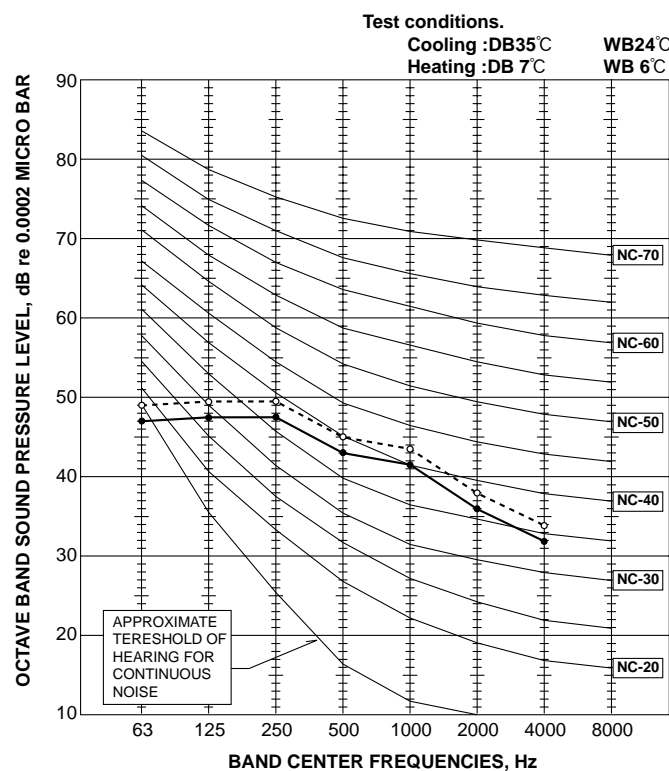
NOTCH	SPL(dB(A))	LINE
HEATING	39	○- - - -○
COOLING		●- - - -●

MUZ-A09RV-<sup>[E1]</sup>

NOTCH	SPL(dB(A))	LINE
HEATING	47	○- - - -○
COOLING	45	●- - - -●

MUZ-A12RV-<sup>[E1]</sup>

NOTCH	SPL(dB(A))	LINE
HEATING	48	○- - - -○
COOLING	46	●- - - -●

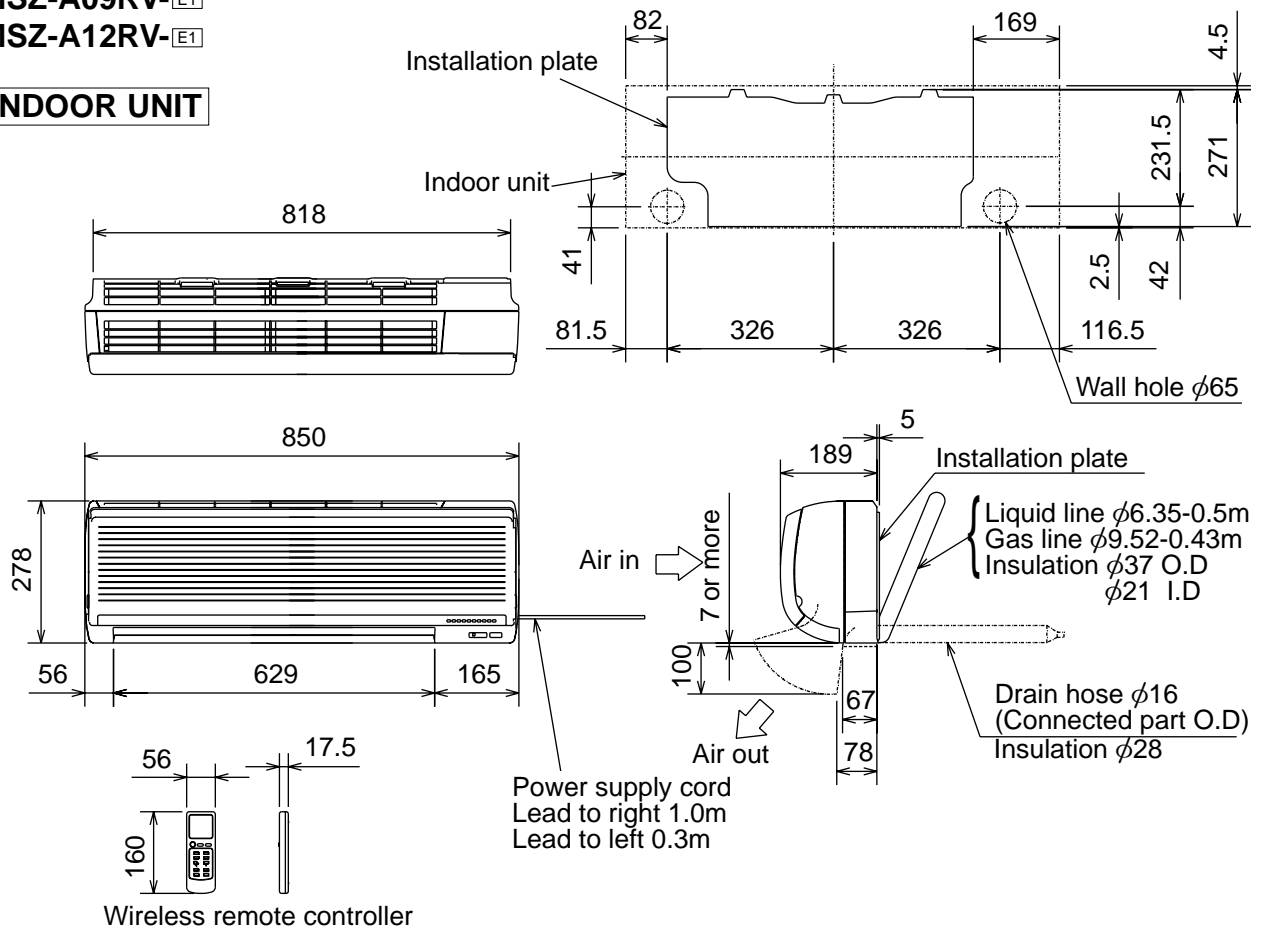




MSZ-A09RV-E1

MSZ-A12RV-E1

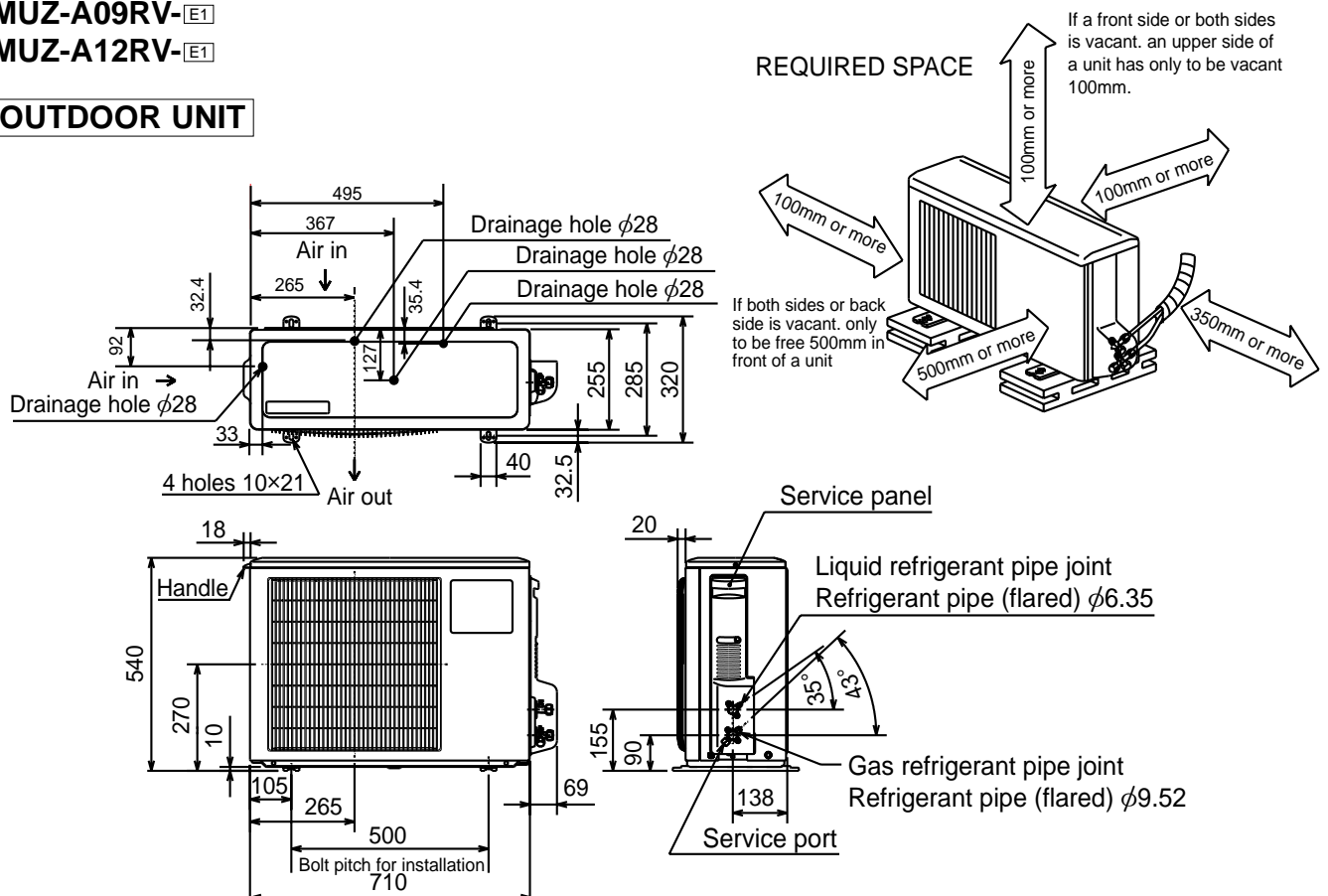
## INDOOR UNIT



MUZ-A09RV-E1

MUZ-A12RV-E1

## OUTDOOR UNIT

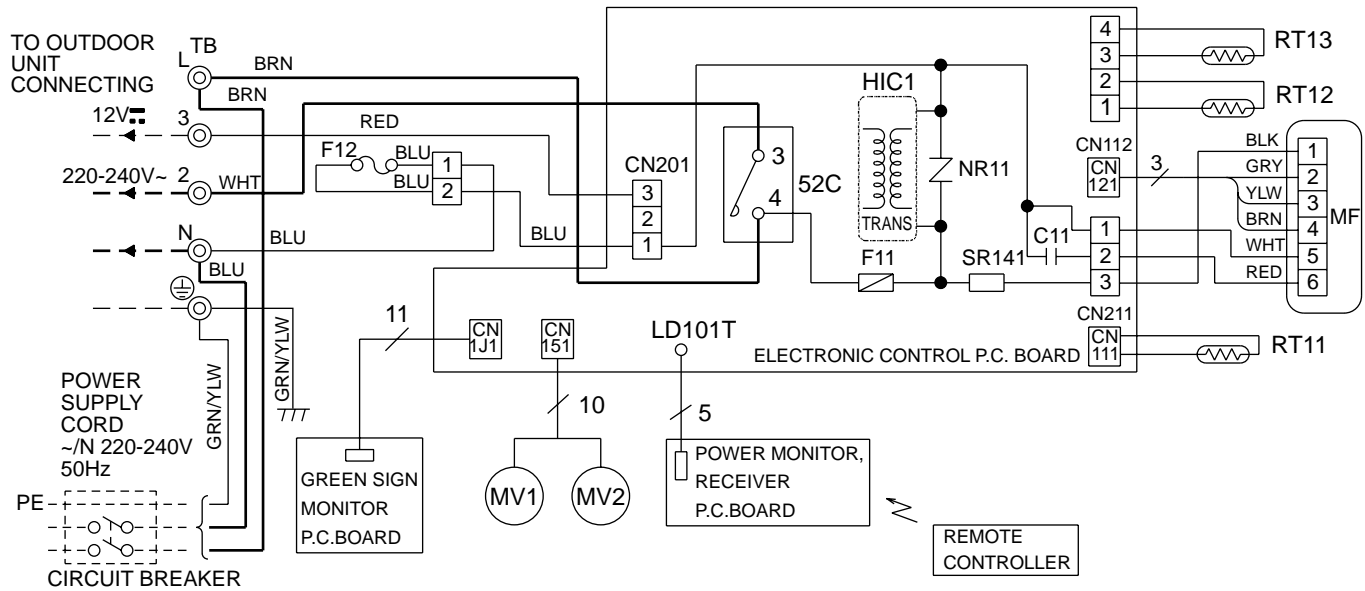


# 6

# WIRING DIAGRAM

## MSZ-A09RV- E1 MSZ-A12RV- E1 MODELS WIRING DIAGRAM

### INDOOR UNIT

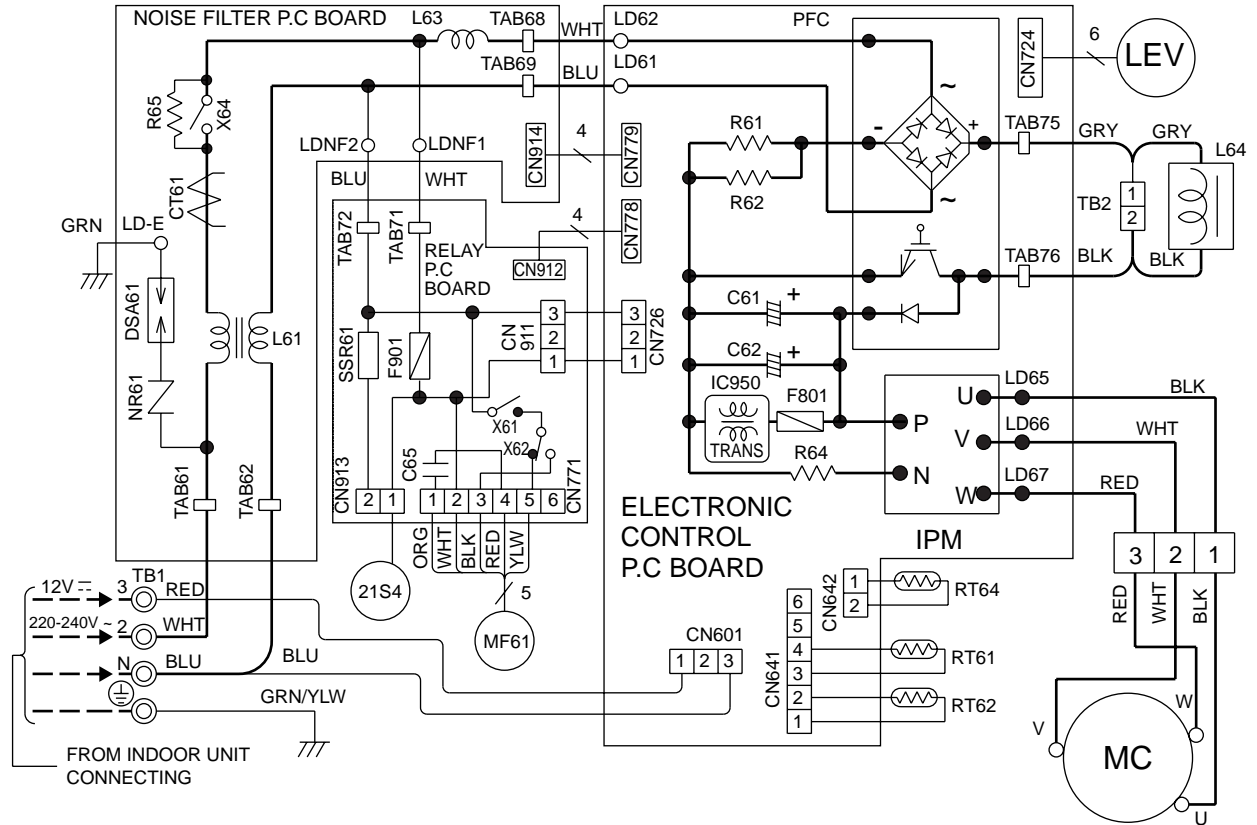


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	NR11	VARISTOR	SR141	SOLID STATE RELAY
F11	FUSE (3.15A)	RT11	ROOM TEMPERATURE THERMISTOR	TB	TERMINAL BLOCK
F12	THERMAL FUSE (93°C)	RT12	INDOOR COIL THERMISTOR (MAIN)	52C	CONTACTOR
HIC1	DC/DC CONVERTER	RT13	INDOOR COIL THERMISTOR (SUB)		
MF	INDOOR FAN MOTOR				
MV1	VANE MOTOR (HORIZONTAL)				
MV2	VANE MOTOR (VERTICAL)				

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing.  
 2. Use copper conductors only. (For field wiring)  
 3. Symbols below indicate.  
 ◎: Terminal block, □□□□: Connector

# MUZ-A09RV- E1 MUZ-A12RV- E1 MODELS WIRING DIAGRAM

## OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CT61	CURRENT TRANSFORMER	L63	COIL	R64	CURRENT-DETECTING RESISTOR
C61,C62	SMOOTHING CAPACITOR	L64	REACTOR	R65	CURRENT-LIMITING RESISTOR
C65	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR	SSR61	SOLID STATE RELAY
DSA61	SURGE ABSORBER	MF61	OUTDOOR FAN MOTOR (INNER FUSE)	TB1, TB2	TERMINAL BLOCK
F801	FUSE (2A)	NR61	VARISTOR	X61, X62	RELAY
F901	FUSE (2A)	PFC	POWER FACTOR CONTROL MODULE	X64	RELAY
IC950	DC/DC CONVERTER	RT61	DISCHARGE TEMPERATURE THERMISTOR	21S4	R.V. COIL (COOLING TURN ON)
IPM	INTELLIGENT POWER MODULE	RT62	DEFROST THERMISTOR		
LEV	EXPANSION VALVE COIL	RT64	FIN TEMPERATURE THERMISTOR		
L61	CMC COIL	R61,62	CURRENT-DETECTING RESISTOR		

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.  
2. Use copper conductors only. (For field wiring)  
3. Symbols below indicate.  
◎: Terminal block, □□□□: Connector

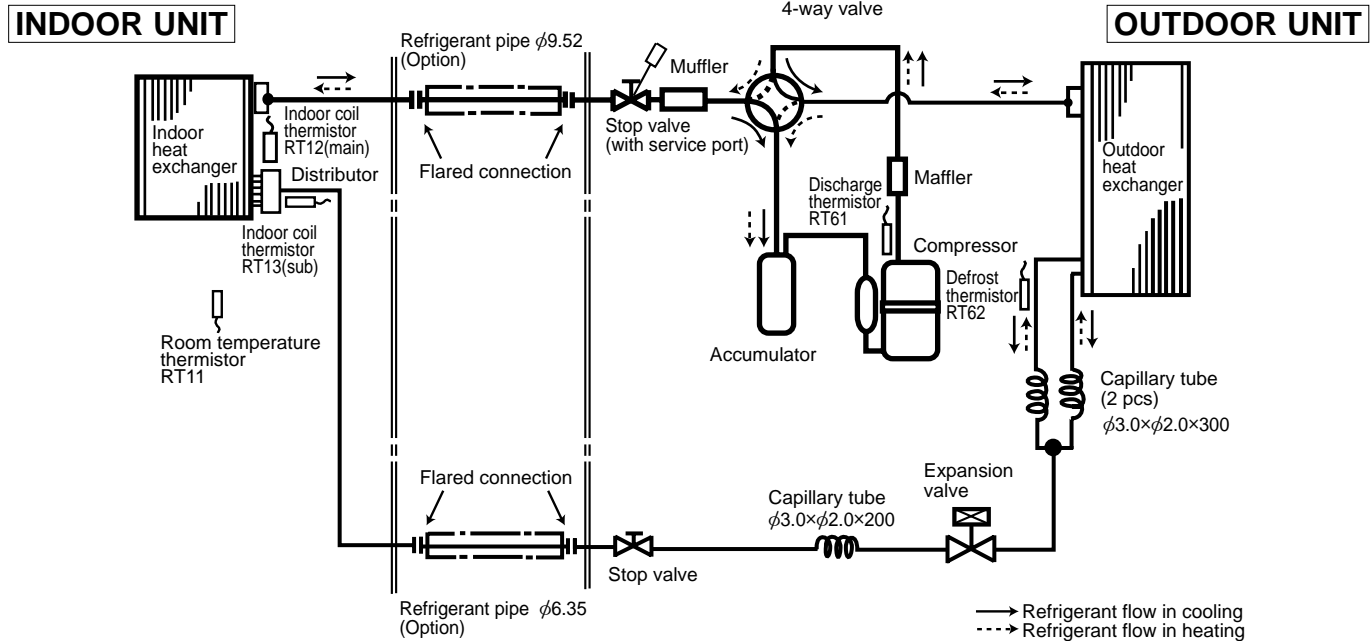
Unit : mm

MSZ-A09RV -[E1]

MUZ-A09RV -[E1]

MSZ-A12RV -[E1]

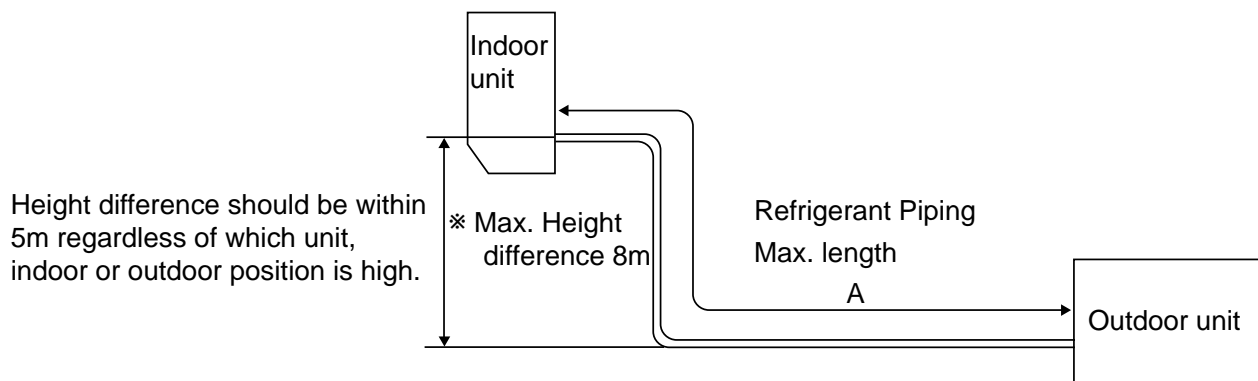
MUZ-A12RV -[E1]



## MAX. REFRIGERANT PIPING LENGTH

Model	Additional piping Max. length :mm A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MSZ-A09RV-[E1] MSZ-A12RV-[E1]	12	9.52	6.35	Liquid: 0.5 Gas : 0.43	0

## MAX. HEIGHT DIFFERENCE



## ADDITIONAL REFRIGERANT CHARGE (R410A:g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)					
		7m	8m	9m	10m	11m	12m
MSZ-A09RV-[E1] MSZ-A12RV-[E1]	1100	0	30	60	90	120	150

Calculation :  $X_g = 30g / m \times (A - 7)m$ 

For additional charging, charge the refrigerant from liquid phase of the gas cylinder.

If the refrigerant inside the cylinder and the outdoor unit.

However, charging the liquid refrigerant all at once may cause the compressor to be locked.

Thus, charge the refrigerant slowly.

**MSZ-A09RV -[E1] MUZ-A12RV -[E1]**

**MSZ-A12RV -[E1] MUZ-A12RV -[E1]**

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

### (1) GUARANTEED VOLTAGE

198 ~ 264V, 50Hz

### (2) AIR FLOW

Air flow should be set at MAX.

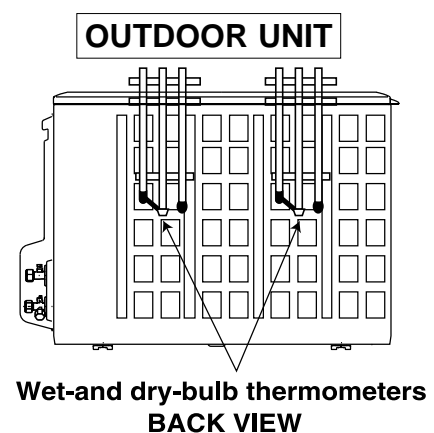
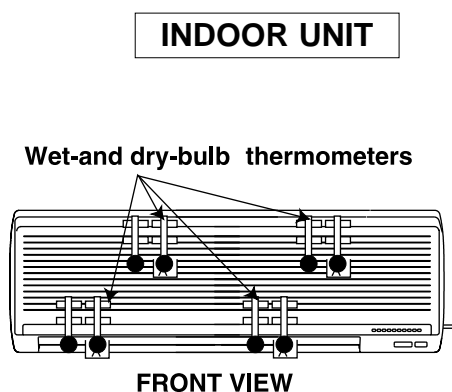
### (3) MAIN READINGS

(1) Indoor intake air wet-bulb temperature	:°C WB	} Cooling
(2) Indoor discharge air wet-bulb temperature	:°C WB	
(3) Outdoor intake air dry-bulb temperature	:°C DB	
(4) Total input	:W	
(5) Indoor intake air dry-bulb temperature	:°C DB	} Heating
(6) Outdoor intake air wet-bulb temperature	:°C WB	
(7) Total input	:W	

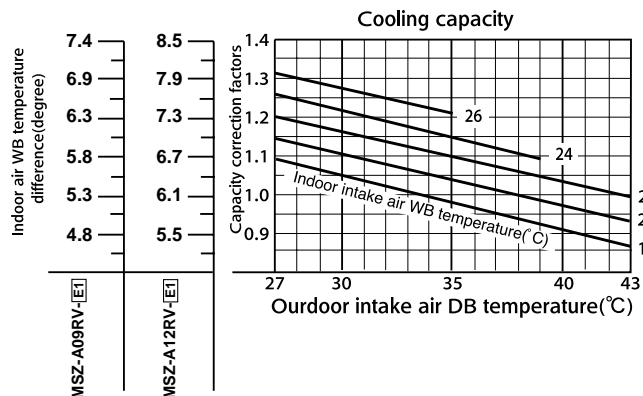
Indoor air wet-bulb temperature difference on the left side of the chart on page 14 and 15 shows the difference between the indoor intake air wet-bulb temperature and the indoor discharge air wet-bulb temperature for your reference at service.

### How to measure the indoor air wet-bulb temperature difference

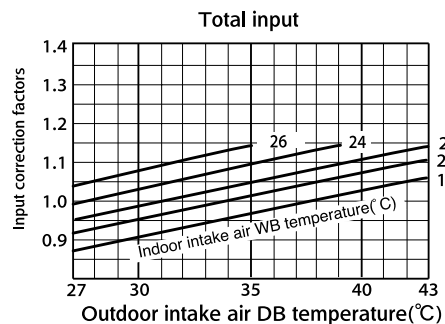
1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once (twice) to start the EMERGENCY COOL (HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.



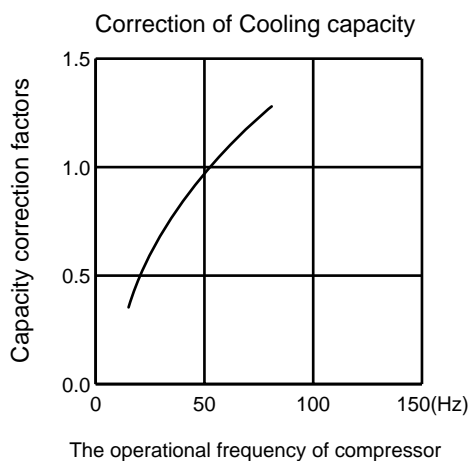
## Cooling capacity



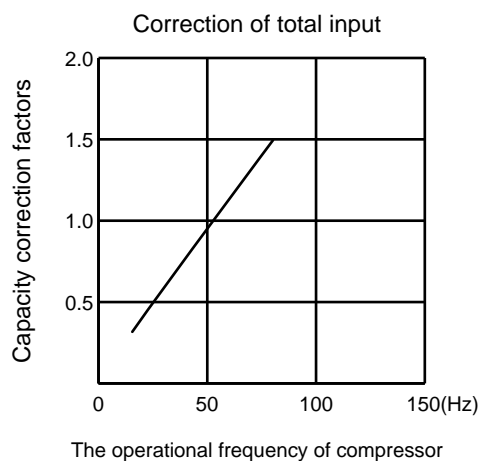
**MUZ-A09RV - [E1]**



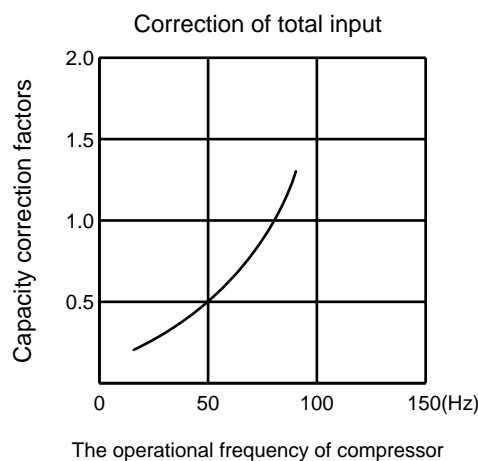
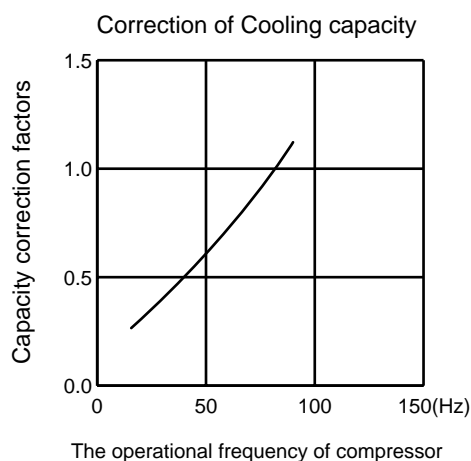
**MUZ-A09RV - [E1]**



**MUZ-A12RV - [E1]**

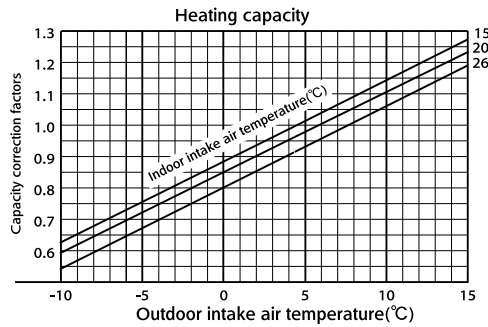
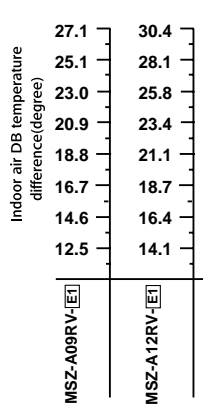


**MUZ-A12RV - [E1]**

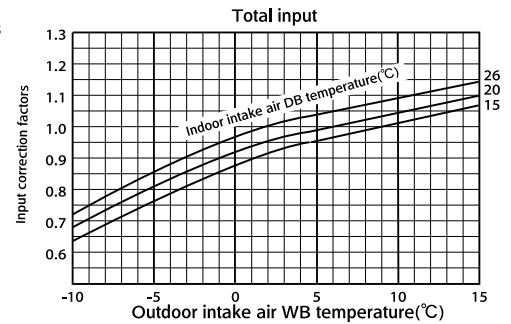


## Heating capacity

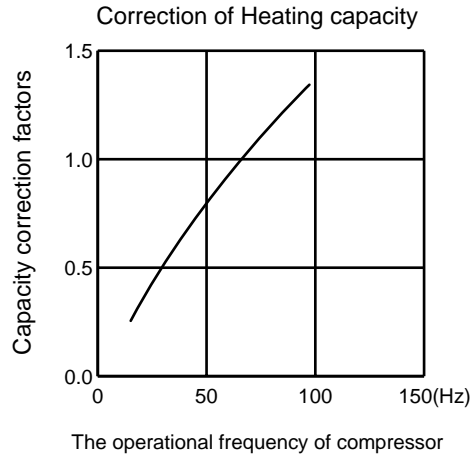
NOTE: The above curves are for the heating operation without any frost.



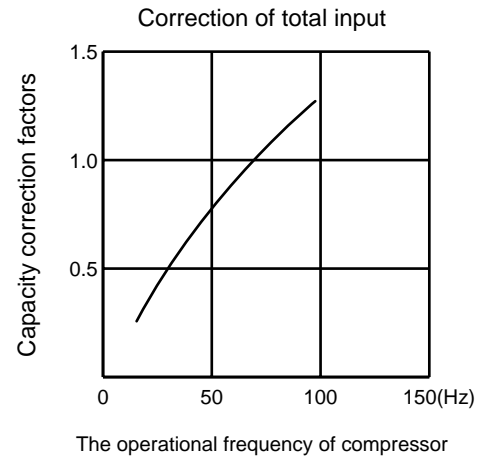
**MUZ-A09RV - [E1]**



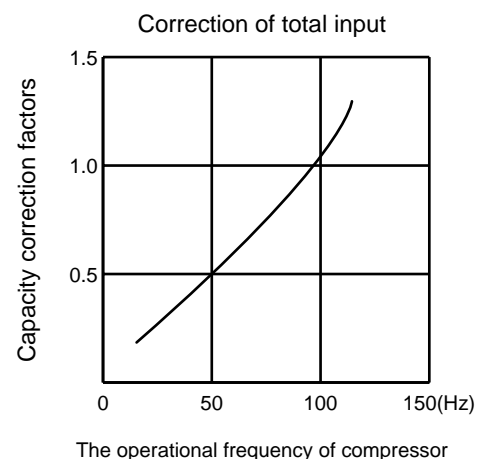
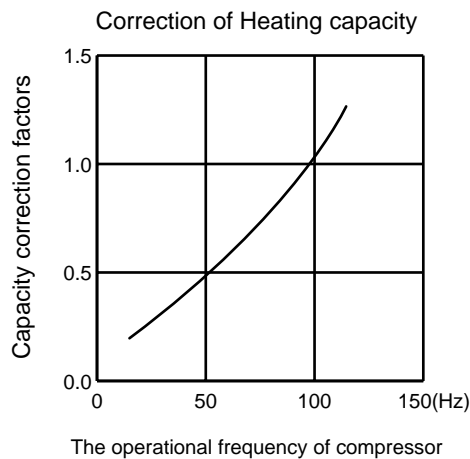
**MUZ-A09RV - [E1]**



**MUZ-A12RV - [E1]**



**MUZ-A12RV - [E1]**



## OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT

How to operate with fixed operational frequency of the compressor.

1. Press the EMERGENCY OPERATION switch on the front of the indoor unit , and select either the COOL mode or the HEAT mode before starting to operate the air conditioner.
2. The compressor starts up.

The operational frequency of the compressor is 83Hz in the COOL mode and 58Hz in the HEAT mode.

3. The fan speed of the indoor unit is High.
4. This operation continues for 30minutes.
5. In order to release this operation, press the EMERGENCY OPERATION switch again, press any button on the remote controller.

**NOTE :** The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/cm<sup>2</sup> [Gauge])**

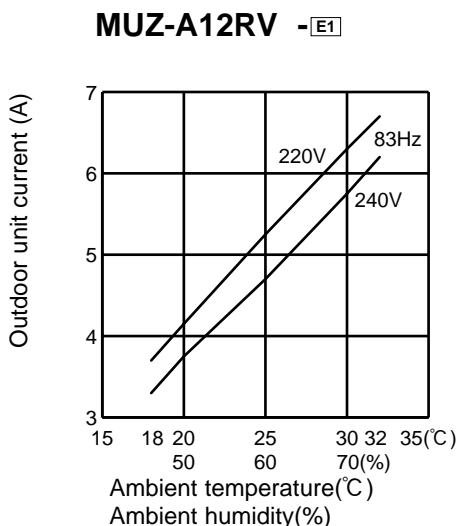
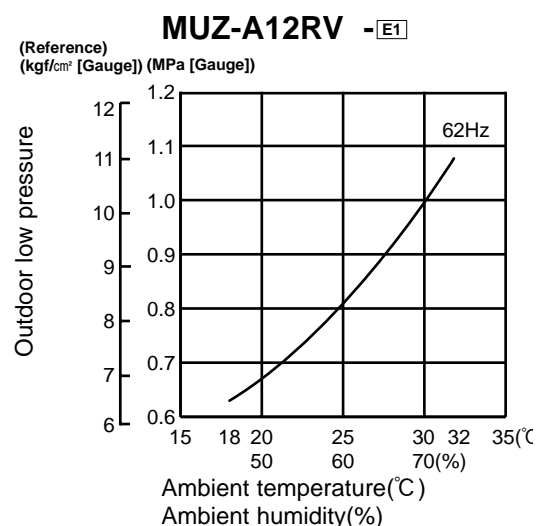
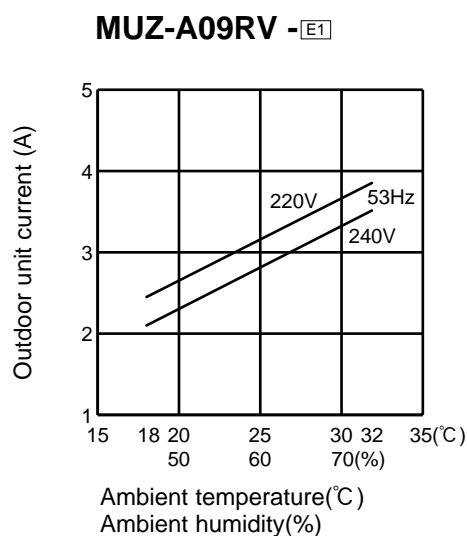
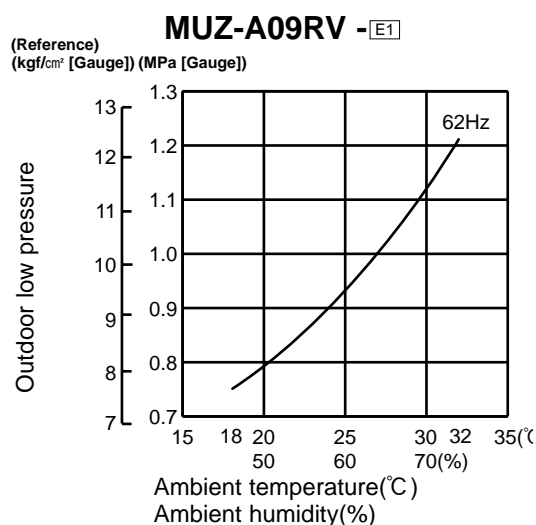
### COOL operation

- ① Both indoor and outdoor unit are under the same temperature/humidity condition.

Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

- ② Air flow should be set at High.

- ③ Operational frequency : 83Hz

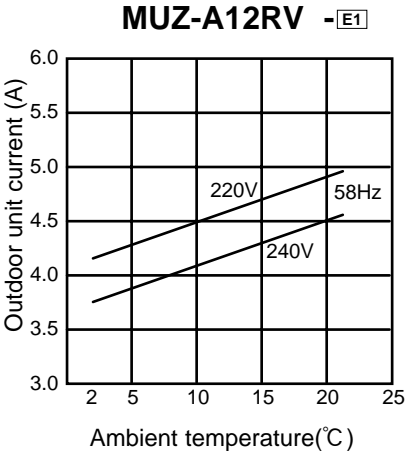
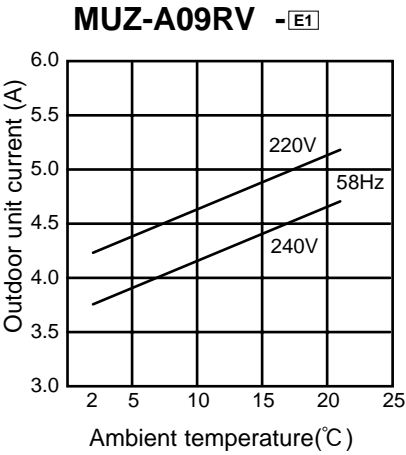






**HEAT operation**

Condition Indoor :	Dry bulb temperature	20.0°C	Outdoor :	Dry bulb temperature	2	7	15	20.0°C
	Wet bulb temperature	14.5°C		Wet bulb temperature	1	6	12	14.5°C



# PERFORMANCE DATA

## COOL operation

**MSZ-A09RV -[E1] MUZ-A09RV -[E1]**

CAPACITY : 2.6 kW INPUT : 800 W SHF : 0.74

		OUTDOOR DB(°C)															
INDOOR DB(°C)	INDOOR WB(°C)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.06	1.71	0.56	640	2.93	1.64	0.56	672	2.81	1.57	0.56	704	2.70	1.51	0.56	736
21	20	3.19	1.40	0.44	672	3.06	1.34	0.44	712	2.96	1.30	0.44	728	2.86	1.26	0.44	760
22	18	3.06	1.83	0.60	640	2.93	1.76	0.60	672	2.81	1.68	0.60	704	2.70	1.62	0.60	736
22	20	3.19	1.53	0.48	672	3.06	1.47	0.48	712	2.96	1.42	0.48	728	2.86	1.37	0.48	760
22	22	3.32	1.19	0.36	696	3.20	1.15	0.36	740	3.12	1.12	0.36	760	2.99	1.08	0.36	792
23	18	3.06	1.96	0.64	640	2.93	1.87	0.64	672	2.81	1.80	0.64	704	2.70	1.73	0.64	736
23	20	3.19	1.66	0.52	672	3.06	1.59	0.52	712	2.96	1.54	0.52	728	2.86	1.49	0.52	760
23	22	3.32	1.33	0.40	696	3.20	1.28	0.40	740	3.12	1.25	0.40	760	2.99	1.20	0.40	792
24	18	3.06	2.08	0.68	640	2.93	1.99	0.68	672	2.81	1.91	0.68	704	2.70	1.84	0.68	736
24	20	3.19	1.78	0.56	672	3.06	1.71	0.56	712	2.96	1.66	0.56	728	2.86	1.60	0.56	760
24	22	3.32	1.46	0.44	696	3.20	1.41	0.44	740	3.12	1.37	0.44	760	2.99	1.32	0.44	792
24	24	3.48	1.11	0.32	728	3.35	1.07	0.32	768	3.28	1.05	0.32	792	3.17	1.02	0.32	832
25	18	3.06	2.20	0.72	640	2.93	2.11	0.72	672	2.81	2.02	0.72	704	2.70	1.95	0.72	736
25	20	3.19	1.91	0.60	672	3.06	1.83	0.60	712	2.96	1.78	0.60	728	2.86	1.72	0.60	760
25	22	3.32	1.59	0.48	696	3.20	1.54	0.48	740	3.12	1.50	0.48	760	2.99	1.44	0.48	792
25	24	3.48	1.25	0.36	728	3.35	1.21	0.36	768	3.28	1.18	0.36	792	3.17	1.14	0.36	832
26	18	3.06	2.32	0.76	640	2.93	2.22	0.76	672	2.81	2.13	0.76	704	2.70	2.06	0.76	736
26	20	3.19	2.04	0.64	672	3.06	1.96	0.64	712	2.96	1.90	0.64	728	2.86	1.83	0.64	760
26	22	3.32	1.72	0.52	696	3.20	1.66	0.52	740	3.12	1.62	0.52	760	2.99	1.55	0.52	792
26	24	3.48	1.39	0.40	728	3.35	1.34	0.40	768	3.28	1.31	0.40	792	3.17	1.27	0.40	832
26	26	3.59	1.00	0.28	768	3.48	0.98	0.28	808	3.43	0.96	0.28	832	3.33	0.93	0.28	856
27	18	3.06	2.44	0.80	640	2.93	2.34	0.80	672	2.81	2.25	0.80	704	2.70	2.16	0.80	736
27	20	3.19	2.17	0.68	672	3.06	2.08	0.68	712	2.96	2.02	0.68	728	2.86	1.94	0.68	760
27	22	3.32	1.86	0.56	696	3.20	1.79	0.56	740	3.12	1.75	0.56	760	2.99	1.67	0.56	792
27	24	3.48	1.53	0.44	728	3.35	1.48	0.44	768	3.28	1.44	0.44	792	3.17	1.40	0.44	832
27	26	3.59	1.15	0.32	768	3.48	1.11	0.32	808	3.43	1.10	0.32	832	3.33	1.06	0.32	856
28	18	3.06	2.57	0.84	640	2.93	2.46	0.84	672	2.81	2.36	0.84	704	2.70	2.27	0.84	736
28	20	3.19	2.29	0.72	672	3.06	2.20	0.72	712	2.96	2.13	0.72	728	2.86	2.06	0.72	760
28	22	3.32	1.99	0.60	696	3.20	1.92	0.60	740	3.12	1.87	0.60	760	2.99	1.79	0.60	792
28	24	3.48	1.67	0.48	728	3.35	1.61	0.48	768	3.28	1.57	0.48	792	3.17	1.52	0.48	832
28	26	3.59	1.29	0.36	768	3.48	1.25	0.36	808	3.43	1.24	0.36	832	3.33	1.20	0.36	856
29	18	3.06	2.69	0.88	640	2.93	2.57	0.88	672	2.81	2.47	0.88	704	2.70	2.38	0.88	736
29	20	3.19	2.42	0.76	672	3.06	2.32	0.76	712	2.96	2.25	0.76	728	2.86	2.17	0.76	760
29	22	3.32	2.12	0.64	696	3.20	2.05	0.64	740	3.12	2.00	0.64	760	2.99	1.91	0.64	792
29	24	3.48	1.81	0.52	728	3.35	1.74	0.52	768	3.28	1.70	0.52	792	3.17	1.65	0.52	832
29	26	3.59	1.44	0.40	768	3.48	1.39	0.40	808	3.43	1.37	0.40	832	3.33	1.33	0.40	856
30	18	3.06	2.81	0.92	640	2.93	2.69	0.92	672	2.81	2.58	0.92	704	2.70	2.49	0.92	736
30	20	3.19	2.55	0.80	672	3.06	2.44	0.80	712	2.96	2.37	0.80	728	2.86	2.29	0.80	760
30	22	3.32	2.25	0.68	696	3.20	2.17	0.68	740	3.12	2.12	0.68	760	2.99	2.03	0.68	792
30	24	3.48	1.95	0.56	728	3.35	1.88	0.56	768	3.28	1.83	0.56	792	3.17	1.78	0.56	832
30	26	3.59	1.58	0.44	768	3.48	1.53	0.44	808	3.43	1.51	0.44	832	3.33	1.46	0.44	856
31	18	3.06	2.93	0.96	640	2.93	2.81	0.96	672	2.81	2.70	0.96	704	2.70	2.60	0.96	736
31	20	3.19	2.68	0.84	672	3.06	2.57	0.84	712	2.96	2.49	0.84	728	2.86	2.40	0.84	760
31	22	3.32	2.39	0.72	696	3.20	2.30	0.72	740	3.12	2.25	0.72	760	2.99	2.15	0.72	792
31	24	3.48	2.09	0.60	728	3.35	2.01	0.60	768	3.28	1.97	0.60	792	3.17	1.90	0.60	832
31	26	3.59	1.72	0.48	768	3.48	1.67	0.48	808	3.43	1.65	0.48	832	3.33	1.60	0.48	856
32	18	3.06	3.06	1.00	640	2.93	2.93	1.00	672	2.81	2.81	1.00	704	2.70	2.70	1.00	736
32	20	3.19	2.80	0.88	672	3.06	2.69	0.88	712	2.96	2.61	0.88	728	2.86	2.52	0.88	760
32	22	3.32	2.52	0.76	696	3.20	2.43	0.76	740	3.12	2.37	0.76	760	2.99	2.27	0.76	792
32	24	3.48	2.23	0.64	728	3.35	2.15	0.64	768	3.28	2.10	0.64	792	3.17	2.03	0.64	832
32	26	3.59	1.87	0.52	768	3.48	1.81	0.52	808	3.43	1.78	0.52	832	3.33	1.73	0.52	856

**NOTE** Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature  
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

# PERFORMANCE DATA

## COOL operation

### MSZ-A09RV -[E1] MUZ-A09RV -[E1]

CAPACITY : 2.6 kW INPUT : 800 W SHF : 0.74

INDOOR DB(°C)	INDOOR WB(°C)	OUTDOOR DB(°C)											
		35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	2.55	1.43	0.56	784	2.34	1.31	0.56	832	2.25	1.26	0.56	848
21	20	2.68	1.18	0.44	816	2.50	1.10	0.44	856	2.41	1.06	0.44	880
22	18	2.55	1.53	0.60	784	2.34	1.40	0.60	832	2.25	1.35	0.60	848
22	20	2.68	1.29	0.48	816	2.50	1.20	0.48	856	2.41	1.15	0.48	880
22	22	2.83	1.02	0.36	848	2.65	0.95	0.36	896	2.56	0.92	0.36	912
23	18	2.55	1.63	0.64	784	2.34	1.50	0.64	832	2.25	1.44	0.64	848
23	20	2.68	1.39	0.52	816	2.50	1.30	0.52	856	2.41	1.25	0.52	880
23	22	2.83	1.13	0.40	848	2.65	1.06	0.40	896	2.56	1.02	0.40	912
24	18	2.55	1.73	0.68	784	2.34	1.59	0.68	832	2.25	1.53	0.68	848
24	20	2.68	1.50	0.56	816	2.50	1.40	0.56	856	2.41	1.35	0.56	880
24	22	2.83	1.25	0.44	848	2.65	1.17	0.44	896	2.56	1.13	0.44	912
24	24	2.99	0.96	0.32	880	2.81	0.90	0.32	920	2.73	0.87	0.32	940
25	18	2.55	1.83	0.72	784	2.34	1.68	0.72	832	2.25	1.62	0.72	848
25	20	2.68	1.61	0.60	816	2.50	1.50	0.60	856	2.41	1.44	0.60	880
25	22	2.83	1.36	0.48	848	2.65	1.27	0.48	896	2.56	1.23	0.48	912
25	24	2.99	1.08	0.36	880	2.81	1.01	0.36	920	2.73	0.98	0.36	940
26	18	2.55	1.94	0.76	784	2.34	1.78	0.76	832	2.25	1.71	0.76	848
26	20	2.68	1.71	0.64	816	2.50	1.60	0.64	856	2.41	1.54	0.64	880
26	22	2.83	1.47	0.52	848	2.65	1.38	0.52	896	2.56	1.33	0.52	912
26	24	2.99	1.20	0.40	880	2.81	1.12	0.40	920	2.73	1.09	0.40	940
26	26	3.15	0.88	0.28	912	2.96	0.83	0.28	952	2.87	0.80	0.28	972
27	18	2.55	2.04	0.80	784	2.34	1.87	0.80	832	2.25	1.80	0.80	848
27	20	2.68	1.82	0.68	816	2.50	1.70	0.68	856	2.41	1.64	0.68	880
27	22	2.83	1.59	0.56	848	2.65	1.49	0.56	896	2.56	1.43	0.56	912
27	24	2.99	1.32	0.44	880	2.81	1.24	0.44	920	2.73	1.20	0.44	940
27	26	3.15	1.01	0.32	912	2.96	0.95	0.32	952	2.87	0.92	0.32	972
28	18	2.55	2.14	0.84	784	2.34	1.97	0.84	832	2.25	1.89	0.84	848
28	20	2.68	1.93	0.72	816	2.50	1.80	0.72	856	2.41	1.73	0.72	880
28	22	2.83	1.70	0.60	848	2.65	1.59	0.60	896	2.56	1.54	0.60	912
28	24	2.99	1.44	0.48	880	2.81	1.35	0.48	920	2.73	1.31	0.48	940
28	26	3.15	1.13	0.36	912	2.96	1.07	0.36	952	2.87	1.03	0.36	972
29	18	2.55	2.24	0.88	784	2.34	2.06	0.88	832	2.25	1.98	0.88	848
29	20	2.68	2.04	0.76	816	2.50	1.90	0.76	856	2.41	1.83	0.76	880
29	22	2.83	1.81	0.64	848	2.65	1.70	0.64	896	2.56	1.64	0.64	912
29	24	2.99	1.55	0.52	880	2.81	1.46	0.52	920	2.73	1.42	0.52	940
29	26	3.15	1.26	0.40	912	2.96	1.19	0.40	952	2.87	1.15	0.40	972
30	18	2.55	2.34	0.92	784	2.34	2.15	0.92	832	2.25	2.07	0.92	848
30	20	2.68	2.14	0.80	816	2.50	2.00	0.80	856	2.41	1.92	0.80	880
30	22	2.83	1.93	0.68	848	2.65	1.80	0.68	896	2.56	1.74	0.68	912
30	24	2.99	1.67	0.56	880	2.81	1.57	0.56	920	2.73	1.53	0.56	940
30	26	3.15	1.38	0.44	912	2.96	1.30	0.44	952	2.87	1.26	0.44	972
31	18	2.55	2.45	0.96	784	2.34	2.25	0.96	832	2.25	2.16	0.96	848
31	20	2.68	2.25	0.84	816	2.50	2.10	0.84	856	2.41	2.02	0.84	880
31	22	2.83	2.04	0.72	848	2.65	1.91	0.72	896	2.56	1.84	0.72	912
31	24	2.99	1.79	0.60	880	2.81	1.68	0.60	920	2.73	1.64	0.60	940
31	26	3.15	1.51	0.48	912	2.96	1.42	0.48	952	2.87	1.38	0.48	972
32	18	2.55	2.55	1.00	784	2.34	2.34	1.00	832	2.25	2.25	1.00	848
32	20	2.68	2.36	0.88	816	2.50	2.20	0.88	856	2.41	2.12	0.88	880
32	22	2.83	2.15	0.76	848	2.65	2.02	0.76	896	2.56	1.95	0.76	912
32	24	2.99	1.91	0.64	880	2.81	1.80	0.64	920	2.73	1.75	0.64	940
32	26	3.15	1.64	0.52	912	2.96	1.54	0.52	952	2.87	1.49	0.52	972

**NOTE** Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature  
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

# **PERFORMANCE DATA**

## **COOL operation**

**MSZ-A12RV -[E1] MUZ-A12RV -[E1]**

CAPACITY : 3.4 kW INPUT : 1220 W SHF : 0.69

		OUTDOOR DB(°C)															
INDOOR DB(°C)	INDOOR WB(°C)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.00	2.04	0.51	976	3.83	1.95	0.51	1025	3.67	1.87	0.51	1074	3.54	1.80	0.51	1122
21	20	4.17	1.62	0.39	1025	4.00	1.56	0.39	1086	3.88	1.51	0.39	1110	3.74	1.46	0.39	1159
22	18	4.00	2.20	0.55	976	3.83	2.10	0.55	1025	3.67	2.02	0.55	1074	3.54	1.94	0.55	1122
22	20	4.17	1.79	0.43	1025	4.00	1.72	0.43	1086	3.88	1.67	0.43	1110	3.74	1.61	0.43	1159
22	22	4.34	1.34	0.31	1061	4.18	1.30	0.31	1129	4.08	1.26	0.31	1159	3.91	1.21	0.31	1208
23	18	4.00	2.36	0.59	976	3.83	2.26	0.59	1025	3.67	2.17	0.59	1074	3.54	2.09	0.59	1122
23	20	4.17	1.96	0.47	1025	4.00	1.88	0.47	1086	3.88	1.82	0.47	1110	3.74	1.76	0.47	1159
23	22	4.34	1.52	0.35	1061	4.18	1.46	0.35	1129	4.08	1.43	0.35	1159	3.91	1.37	0.35	1208
24	18	4.00	2.52	0.63	976	3.83	2.41	0.63	1025	3.67	2.31	0.63	1074	3.54	2.23	0.63	1122
24	20	4.17	2.12	0.51	1025	4.00	2.04	0.51	1086	3.88	1.98	0.51	1110	3.74	1.91	0.51	1159
24	22	4.34	1.69	0.39	1061	4.18	1.63	0.39	1129	4.08	1.59	0.39	1159	3.91	1.52	0.39	1208
24	24	4.56	1.23	0.27	1110	4.39	1.18	0.27	1171	4.28	1.16	0.27	1208	4.15	1.12	0.27	1269
25	18	4.00	2.68	0.67	976	3.83	2.56	0.67	1025	3.67	2.46	0.67	1074	3.54	2.37	0.67	1122
25	20	4.17	2.29	0.55	1025	4.00	2.20	0.55	1086	3.88	2.13	0.55	1110	3.74	2.06	0.55	1159
25	22	4.34	1.86	0.43	1061	4.18	1.80	0.43	1129	4.08	1.75	0.43	1159	3.91	1.68	0.43	1208
25	24	4.56	1.41	0.31	1110	4.39	1.36	0.31	1171	4.28	1.33	0.31	1208	4.15	1.29	0.31	1269
26	18	4.00	2.84	0.71	976	3.83	2.72	0.71	1025	3.67	2.61	0.71	1074	3.54	2.51	0.71	1122
26	20	4.17	2.46	0.59	1025	4.00	2.36	0.59	1086	3.88	2.29	0.59	1110	3.74	2.21	0.59	1159
26	22	4.34	2.04	0.47	1061	4.18	1.97	0.47	1129	4.08	1.92	0.47	1159	3.91	1.84	0.47	1208
26	24	4.56	1.59	0.35	1110	4.39	1.54	0.35	1171	4.28	1.50	0.35	1208	4.15	1.45	0.35	1269
26	26	4.69	1.08	0.23	1171	4.56	1.05	0.23	1232	4.49	1.03	0.23	1269	4.35	1.00	0.23	1305
27	18	4.00	3.00	0.75	976	3.83	2.87	0.75	1025	3.67	2.75	0.75	1074	3.54	2.65	0.75	1122
27	20	4.17	2.62	0.63	1025	4.00	2.52	0.63	1086	3.88	2.44	0.63	1110	3.74	2.36	0.63	1159
27	22	4.34	2.21	0.51	1061	4.18	2.13	0.51	1129	4.08	2.08	0.51	1159	3.91	1.99	0.51	1208
27	24	4.56	1.78	0.39	1110	4.39	1.71	0.39	1171	4.28	1.67	0.39	1208	4.15	1.62	0.39	1269
27	26	4.69	1.27	0.27	1171	4.56	1.23	0.27	1232	4.49	1.21	0.27	1269	4.35	1.18	0.27	1305
28	18	4.00	3.16	0.79	976	3.83	3.02	0.79	1025	3.67	2.90	0.79	1074	3.54	2.79	0.79	1122
28	20	4.17	2.79	0.67	1025	4.00	2.68	0.67	1086	3.88	2.60	0.67	1110	3.74	2.51	0.67	1159
28	22	4.34	2.38	0.55	1061	4.18	2.30	0.55	1129	4.08	2.24	0.55	1159	3.91	2.15	0.55	1208
28	24	4.56	1.96	0.43	1110	4.39	1.89	0.43	1171	4.28	1.84	0.43	1208	4.15	1.78	0.43	1269
28	26	4.69	1.45	0.31	1171	4.56	1.41	0.31	1232	4.49	1.39	0.31	1269	4.35	1.35	0.31	1305
29	18	4.00	3.32	0.83	976	3.83	3.17	0.83	1025	3.67	3.05	0.83	1074	3.54	2.93	0.83	1122
29	20	4.17	2.96	0.71	1025	4.00	2.84	0.71	1086	3.88	2.75	0.71	1110	3.74	2.66	0.71	1159
29	22	4.34	2.56	0.59	1061	4.18	2.47	0.59	1129	4.08	2.41	0.59	1159	3.91	2.31	0.59	1208
29	24	4.56	2.14	0.47	1110	4.39	2.06	0.47	1171	4.28	2.01	0.47	1208	4.15	1.95	0.47	1269
29	26	4.69	1.64	0.35	1171	4.56	1.59	0.35	1232	4.49	1.57	0.35	1269	4.35	1.52	0.35	1305
30	18	4.00	3.48	0.87	976	3.83	3.33	0.87	1025	3.67	3.19	0.87	1074	3.54	3.08	0.87	1122
30	20	4.17	3.12	0.75	1025	4.00	3.00	0.75	1086	3.88	2.91	0.75	1110	3.74	2.81	0.75	1159
30	22	4.34	2.73	0.63	1061	4.18	2.63	0.63	1129	4.08	2.57	0.63	1159	3.91	2.46	0.63	1208
30	24	4.56	2.32	0.51	1110	4.39	2.24	0.51	1171	4.28	2.18	0.51	1208	4.15	2.12	0.51	1269
30	26	4.69	1.83	0.39	1171	4.56	1.78	0.39	1232	4.49	1.75	0.39	1269	4.35	1.70	0.39	1305
31	18	4.00	3.64	0.91	976	3.83	3.48	0.91	1025	3.67	3.34	0.91	1074	3.54	3.22	0.91	1122
31	20	4.17	3.29	0.79	1025	4.00	3.16	0.79	1086	3.88	3.06	0.79	1110	3.74	2.95	0.79	1159
31	22	4.34	2.90	0.67	1061	4.18	2.80	0.67	1129	4.08	2.73	0.67	1159	3.91	2.62	0.67	1208
31	24	4.56	2.51	0.55	1110	4.39	2.41	0.55	1171	4.28	2.36	0.55	1208	4.15	2.28	0.55	1269
31	26	4.69	2.02	0.43	1171	4.56	1.96	0.43	1232	4.49	1.93	0.43	1269	4.35	1.87	0.43	1305
32	18	4.00	3.80	0.95	976	3.83	3.63	0.95	1025	3.67	3.49	0.95	1074	3.54	3.36	0.95	1122
32	20	4.17	3.46	0.83	1025	4.00	3.32	0.83	1086	3.88	3.22	0.83	1110	3.74	3.10	0.83	1159
32	22	4.34	3.08	0.71	1061	4.18	2.97	0.71	1129	4.08	2.90	0.71	1159	3.91	2.78	0.71	1208
32	24	4.56	2.69	0.59	1110	4.39	2.59	0.59	1171	4.28	2.53	0.59	1208	4.15	2.45	0.59	1269
32	26	4.69	2.21	0.47	1171	4.56	2.14	0.47	1232	4.49	2.11	0.47	1269	4.35	2.05	0.47	1305

**NOTE** Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature  
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

# **PERFORMANCE DATA**

## **COOL operation**

**MSZ-A12RV -[E1] MUZ-A12RV -[E1]**

CAPACITY : 3.4 kW INPUT : 1220 W SHF : 0.69

INDOOR DB(°C)	INDOOR WB(°C)	OUTDOOR DB(°C)											
		35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	3.33	1.70	0.51	1196	3.06	1.56	0.51	1269	2.94	1.50	0.51	1293
21	20	3.50	1.37	0.39	1244	3.26	1.27	0.39	1305	3.15	1.23	0.39	1342
22	18	3.33	1.83	0.55	1196	3.06	1.68	0.55	1269	2.94	1.62	0.55	1293
22	20	3.50	1.51	0.43	1244	3.26	1.40	0.43	1305	3.15	1.35	0.43	1342
22	22	3.71	1.15	0.31	1293	3.47	1.08	0.31	1366	3.35	1.04	0.31	1391
23	18	3.33	1.97	0.59	1196	3.06	1.81	0.59	1269	2.94	1.74	0.59	1293
23	20	3.50	1.65	0.47	1244	3.26	1.53	0.47	1305	3.15	1.48	0.47	1342
23	22	3.71	1.30	0.35	1293	3.47	1.21	0.35	1366	3.35	1.17	0.35	1391
24	18	3.33	2.10	0.63	1196	3.06	1.93	0.63	1269	2.94	1.85	0.63	1293
24	20	3.50	1.79	0.51	1244	3.26	1.66	0.51	1305	3.15	1.60	0.51	1342
24	22	3.71	1.45	0.39	1293	3.47	1.35	0.39	1366	3.35	1.31	0.39	1391
24	24	3.91	1.06	0.27	1342	3.67	0.99	0.27	1403	3.57	0.96	0.27	1434
25	18	3.33	2.23	0.67	1196	3.06	2.05	0.67	1269	2.94	1.97	0.67	1293
25	20	3.50	1.93	0.55	1244	3.26	1.80	0.55	1305	3.15	1.73	0.55	1342
25	22	3.71	1.59	0.43	1293	3.47	1.49	0.43	1366	3.35	1.44	0.43	1391
25	24	3.91	1.21	0.31	1342	3.67	1.14	0.31	1403	3.57	1.11	0.31	1434
26	18	3.33	2.37	0.71	1196	3.06	2.17	0.71	1269	2.94	2.09	0.71	1293
26	20	3.50	2.07	0.59	1244	3.26	1.93	0.59	1305	3.15	1.86	0.59	1342
26	22	3.71	1.74	0.47	1293	3.47	1.63	0.47	1366	3.35	1.57	0.47	1391
26	24	3.91	1.37	0.35	1342	3.67	1.29	0.35	1403	3.57	1.25	0.35	1434
26	26	4.11	0.95	0.23	1391	3.88	0.89	0.23	1452	3.76	0.86	0.23	1482
27	18	3.33	2.50	0.75	1196	3.06	2.30	0.75	1269	2.94	2.21	0.75	1293
27	20	3.50	2.21	0.63	1244	3.26	2.06	0.63	1305	3.15	1.98	0.63	1342
27	22	3.71	1.89	0.51	1293	3.47	1.77	0.51	1366	3.35	1.71	0.51	1391
27	24	3.91	1.52	0.39	1342	3.67	1.43	0.39	1403	3.57	1.39	0.39	1434
27	26	4.11	1.11	0.27	1391	3.88	1.05	0.27	1452	3.76	1.01	0.27	1482
28	18	3.33	2.63	0.79	1196	3.06	2.42	0.79	1269	2.94	2.32	0.79	1293
28	20	3.50	2.35	0.67	1244	3.26	2.19	0.67	1305	3.15	2.11	0.67	1342
28	22	3.71	2.04	0.55	1293	3.47	1.91	0.55	1366	3.35	1.84	0.55	1391
28	24	3.91	1.68	0.43	1342	3.67	1.58	0.43	1403	3.57	1.54	0.43	1434
28	26	4.11	1.28	0.31	1391	3.88	1.20	0.31	1452	3.76	1.16	0.31	1482
29	18	3.33	2.77	0.83	1196	3.06	2.54	0.83	1269	2.94	2.44	0.83	1293
29	20	3.50	2.49	0.71	1244	3.26	2.32	0.71	1305	3.15	2.23	0.71	1342
29	22	3.71	2.19	0.59	1293	3.47	2.05	0.59	1366	3.35	1.98	0.59	1391
29	24	3.91	1.84	0.47	1342	3.67	1.73	0.47	1403	3.57	1.68	0.47	1434
29	26	4.11	1.44	0.35	1391	3.88	1.36	0.35	1452	3.76	1.31	0.35	1482
30	18	3.33	2.90	0.87	1196	3.06	2.66	0.87	1269	2.94	2.56	0.87	1293
30	20	3.50	2.63	0.75	1244	3.26	2.45	0.75	1305	3.15	2.36	0.75	1342
30	22	3.71	2.33	0.63	1293	3.47	2.18	0.63	1366	3.35	2.11	0.63	1391
30	24	3.91	1.99	0.51	1342	3.67	1.87	0.51	1403	3.57	1.82	0.51	1434
30	26	4.11	1.60	0.39	1391	3.88	1.51	0.39	1452	3.76	1.47	0.39	1482
31	18	3.33	3.03	0.91	1196	3.06	2.78	0.91	1269	2.94	2.68	0.91	1293
31	20	3.50	2.77	0.79	1244	3.26	2.58	0.79	1305	3.15	2.48	0.79	1342
31	22	3.71	2.48	0.67	1293	3.47	2.32	0.67	1366	3.35	2.24	0.67	1391
31	24	3.91	2.15	0.55	1342	3.67	2.02	0.55	1403	3.57	1.96	0.55	1434
31	26	4.11	1.77	0.43	1391	3.88	1.67	0.43	1452	3.76	1.62	0.43	1482
32	18	3.33	3.17	0.95	1196	3.06	2.91	0.95	1269	2.94	2.79	0.95	1293
32	20	3.50	2.91	0.83	1244	3.26	2.71	0.83	1305	3.15	2.61	0.83	1342
32	22	3.71	2.63	0.71	1293	3.47	2.46	0.71	1366	3.35	2.38	0.71	1391
32	24	3.91	2.31	0.59	1342	3.67	2.17	0.59	1403	3.57	2.11	0.59	1434
32	26	4.11	1.93	0.47	1391	3.88	1.82	0.47	1452	3.76	1.77	0.47	1482

**NOTE** Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature  
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

**PERFORMANCE DATA****HEAT operation****MSZ-A09RV -[E1] MUZ-A09RV -[E1]**

CAPACITY : 3.6 kW INPUT : 990 W

INDOOR DB(°C)	OUTDOOR WB(°C)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	2.27	644	2.74	772	3.20	871	3.67	941	4.14	1000	4.57	1030	5.04	1049
21	2.16	693	2.59	822	3.06	911	3.49	980	3.96	1030	4.39	1059	4.84	1099
26	1.94	743	2.41	871	2.84	960	3.31	1030	3.78	1079	4.21	1109	4.68	1139

**PERFORMANCE DATA****HEAT operation****MSZ-A12RV -[E1] MUZ-A12RV -[E1]**

CAPACITY : 4.8 kW INPUT : 1580 W

INDOOR DB(°C)	OUTDOOR WB(°C)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.02	1027	3.65	1232	4.27	1390	4.90	1501	5.52	1596	6.10	1643	6.72	1675
21	2.88	1106	3.46	1311	4.08	1454	4.66	1564	5.28	1643	5.86	1691	6.46	1754
26	2.59	1185	3.22	1390	3.79	1533	4.42	1643	5.04	1722	5.62	1770	6.24	1817

**NOTE** Q :Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature WB: Wet-bulb temperature

**MSZ-A09RV-<sup>[E1]</sup> MUZ-A09RV-<sup>[E1]</sup>**

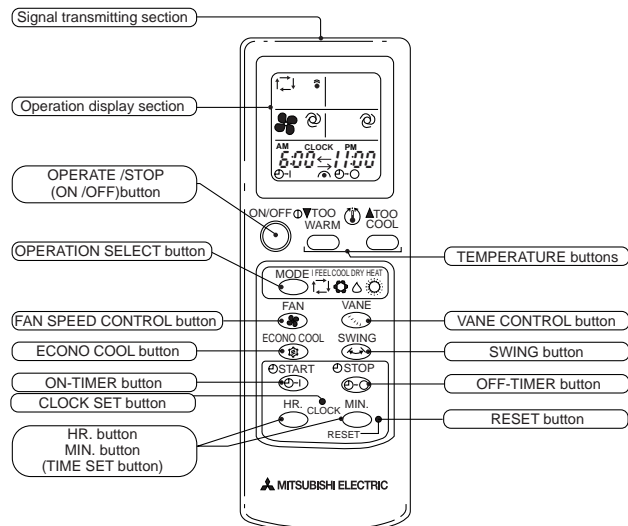
**MSZ-A12RV-<sup>[E1]</sup> MUZ-A12RV-<sup>[E1]</sup>**

Once the controls are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.

Indoor unit receives the signal with a beep tone.

When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

## WIRELESS REMOTE CONTROLLER



## INDOOR UNIT DISPLAY SECTION

### GREEN SIGN

GREEN SIGN shows the current room temperature and set temperature.

The room temperature indicated on the temperature monitor lamp may not be exactly the same as the actual room temperature.

Available the set temperature range is 16°C ~31°C, however, indication range of temperature monitor lamp is 21°C ~30°C.

**The set temperature (lighting) and room temperature (blinking) are displayed.**

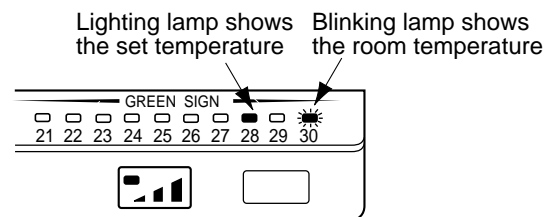
#### 1. When the room temperature or set temperature is out of the indication range

If the set temperature is lower than 21°C, indicating lamp at 21°C is lighting. And if the room temperature is lower than 21°C, indicating lamp at 21°C is blinking.

If the set temperature is higher than 30°C, indicating lamp at 30°C is lighting. And if the room temperature is higher than 30°C, indicating lamp at 30°C is blinking.

**(Example)** When the set temperature is 28°C, indicating lamp at 28°C is lighting.

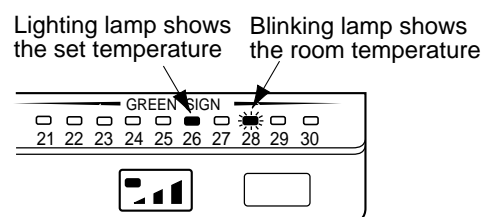
When the room temperature is 30°C or higher, indicating lamp at 30°C is blinking.



#### 2. When the room temperature or set temperature is within the indication range

**(Example)** When the set temperature is 26°C, indicating lamp at 26°C is lighting.

When the room temperature is 27.5°C or higher and lower than 28.5°C, indicating lamp at 28°C is blinking.




※ When the set temperature and room temperature are the same, corresponding indicating lamp is lighting.



### NOTE:

- When the unit is not operating : Both POWER MONITOR lamp and green sign lamps are off.
- When ON- Timer is set : POWER MONITOR lamp is on. All green sign lamps are off.
- When OFF- Timer is set : The lamp indication is as same as ordinary operation.

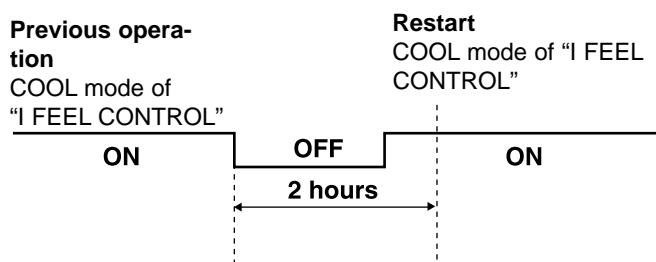
### 9-1. "I FEEL CONTROL" ( ) OPERATION

1. Press OPERATE/STOP(ON/OFF) button on the remote controller. POWER MONITOR lamp of the indoor unit will turn on with a beep tone.
2. Press OPERATION SELECT button to set "I FEEL CONTROL"(  ) Then a beep tone is heard.
3. The operation mode is determined by the room temperature at start-up of the operation.

Initial room temperature	Mode
more than 25°C	COOL mode of "I FEEL CONTROL"
23°C to 25°C	DRY mode of "I FEEL CONTROL"
less than 23°C	HEAT mode of "I FEEL CONTROL"

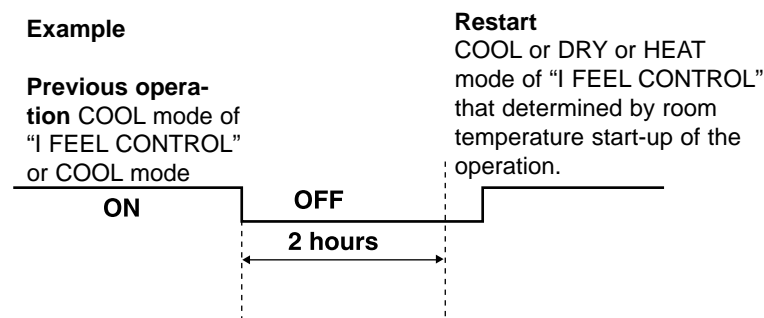
- Once the mode is fixed, the mode will not change by room temperature afterwards.
- Under the ON-TIMER (  ) operation, mode is determined according to the room temperature as the operation starts.
- When the system is stopped with the OPERATE/STOP(ON/OFF) button on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (  ) mode, the system operates in previous mode automatically regardless of the room temperature.

#### Example



When the system is restarted after 2 hours, the operation mode is determined by the initial room temperature at start-up of the operation.

#### Example



4. The initial set temperature is decided by the initial room temperature.

Model	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	✱1
	26℃ or less	Initial room temperatureminus 2℃	
DRY mode of "I FEEL CONTROL"	23℃ to 25℃	Initial room temperatureminus 2℃	
HEAT mode of "I FEEL CONTROL"	23℃ or less	26℃	

- ✱1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.  
The set temperature is calculated by the previous set temperature.



## 5. TEMPERATURE buttons

In "I FEEL CONTROL" (☺) mode, set temperature is decided by the microprocessor based on the room temperature. In addition, set temperature is controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm. Pressing the TOO WARM or TOO COOL button emits a beep tone.

### ● Fuzzy control

When the TOO COOL or TOO WARM button is pressed, the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user's preference to heat or cold. So this is called "Fuzzy control", and works only in "I FEEL CONTROL" mode.

In DRY mode of "I FEEL CONTROL", the set temperature doesn't change.

### ▼ TOO

COOL ... To raise the set temperature 1 ~ 2 degrees (°C)



### ▲ TOO

WARM ... To lower the set temperature 1 ~ 2 degrees (°C)



## 9-1-1. Cool mode of "I FEEL CONTROL"

### 1. Following are the fan speed in AUTO.

Temperature difference	Fan speed	Difference between room temperature and set temperature during operation.
Room temperature minus set temperature: 2 degrees or more	High	4 deg.
Room temperature minus set temperature: 1 degree or more and less than 2 degrees	Med.	2 deg.
Room temperature minus set temperature: less than 1 degree	Low	1 deg.

### 2. Time control

When the three conditions below have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.

(1). Compressor has been continuously operating.

(2). Indoor fan speed is Low or Med.

(3). Room temperature is below 26°C.

When compressor turns off half way, the accumulated time is cancelled.

When compressor turns on again, time counting starts from the beginning.

When the indoor fan speed becomes High or the room temperature exceeds 26°C, time counting stops temporarily.

After, when the above conditions are satisfied again, time counting restarts.

The indoor fan operates at set speed.

### 3. Coil frost prevention mode

The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor (RT12).

Temperature of indoor coil thermistor: Th	Operation frequency
approx. 8°C or above	normal
approx. 6°C to 8°C	fixed
approx. 3°C to 6°C	lower at the rate of 3Hz/min
approx. 3°C or below	lower at the rate of 6Hz/min Compressor is turned OFF for 5 minutes when temperature of indoor coil thermistor continues approx. 3°C or below for 5 minutes or more.

- The indoor fan maintains the actual speed of the moment.

## 9-1-2. DRY mode of "I FEEL CONTROL"

The system for dry operation uses the same refrigerant circuit as the cooling circuit.

The compressor and the indoor fan are controlled by the temperature.

By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

The operation of the compressor and indoor fan is as follows.

Compressor operates by temperature control and time control.

① Set temperature is controlled to fall 2°C as initial set temperature.

② Indoor fan and outdoor fan operate in the same cycle as the compressor.

③ Operational frequency control of compressor is fixed 30Hz.

NOTE ● Coil frost prevention during DRY mode of "I FEEL CONTROL"

The operation is same as coil frost prevention during COOL mode of "I FEEL CONTROL".

## Defrosting in DRY mode

The operational frequency of the compressor is controlled based on the temperature of the indoor coil thermistor (RT12).

Temperature of indoor coil thermistor:RT12	Operation frequency
approx. 8°C or above	normal
approx. 6°C to 8°C	fixed
approx. 3°C to 6°C	lower at the rate of 3Hz/min
approx. 3°C or below	lower at the rate of 6Hz/min Compressor is turned OFF for 5 minutes when temperature of indoor coil thermistor continues approx. 3°C or below for 5 minutes or more.

The indoor fan maintains the actual speed of the moment. However, it changes to Low speed when the compressor stops.

## 9-1-3. HEAT mode of "I FEEL CONTROL"

### 1. Indoor fan speed control

(1) Indoor fan operates at the set speed by FAN SPEED CONTROL button.

In Auto the fan speed is as follows.

Initial temperature difference	Fan speed	Difference between room temperature and set temperature during operation
Set temperature minus room temperature: 2 degrees or more	High	
Set temperature minus room temperature: Between 1 and 2 degrees	Med.	2 deg. 4 deg.
Set temperature minus room temperature: less than 1 degree	Low	1 deg. 1.7 deg.

(2) Cold air prevention control

① When the compressor is not operating,

( I ) if the temperature of indoor coil thermistor RT12 is 18°C or less, the fan stops.

( II ) if the temperature of indoor coil thermistor RT12 is more than 18°C, the fan operates at Very Low.

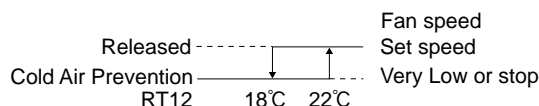
② When the compressor is operating,

( I ) if the temperature of RT12 is 22°C or more, the fan operates at set speed.

( II ) if the temperature of RT12 is less than 22°C and

( i ) if the temperature of room temperature thermistor RT11 is 15°C or less, the fan stops.

( ii ) if the temperature of room temperature thermistor RT11 is more than 15°C, the fan operates at Very Low.



**NOTE :** At initial and after defrosting, when the RT12 is from 18°C to 22°C, Cold Air Prevention control works.

(3) Warm air control.

When the following any condition of ①(a. ~ d.) and the condition of ② are satisfied at the same time, warm air control works.

① a.) when the operation mode has been changed to HEAT mode

b.) when cold air prevention has been released

c.) when defrosting has been finished

d.) when the compressor starts in HEAT mode

② When the temperature of indoor coil thermistor RT12 is less than 37°C.

When warm air control works, the fan speed changes as follows to blow out warm air gradually.

### Gradation of fan speed in initial

<Time condition>	<Indoor fan speed>
less than 2 minutes	Low
2 minutes to 4 minutes	Med.
more than 4 minutes	High

The upper limit of the fan speed in MANUAL is the set speed.

The upper limit of the fan speed in AUTO is the speed decided by indoor fan speed control.

When the temperature of RT12 has been 37°C or more, or when the set speed has been changed, this control is released and the fan speed is the set speed.

(4) Flow soft control

When the thermostat (compressor) is off, the indoor fan operates as follows.

Compressor	Fan
OFF	Very Low
ON	Set speed

**NOTE :** When the thermostat(compressor) turns on, the fan will operate at set speed. But until cold air prevention and warm air control is released.

## 2. High pressure protection

In HEAT mode and manually-operated HEAT mode, the indoor coil thermistor detects the temperature at the indoor heat exchanger and controls the compressor rotational frequency to prevent the condensing pressure from increasing excessively.

## 3. Overload starting

When the room temperature thermistor reads 18°C or above, the compressor runs with its maximum frequency regulated for 3 minutes after the start-up.

## 4. Defrosting in HEAT mode

(1) Starting conditions of defrosting

- The defrost thermistor attached to the outdoor heat exchanger read -3°C or below.
- The cumulative operation time of the compressor has reached any of the set values: 30, 40, 45, 55, 65, 75, 85, 95, 105, 115 minutes.
- More than 5 minutes have passed since the start-up of the compressor.

When the above three conditions, a), b), and c), are satisfied, the defrosting starts.

\*Set value of compressor operation time(hereinafter referred to as defrost interval)

The first defrost interval is 40 minutes long, and the second 45 minutes long. The third and subsequent intervals are set to be longer, and less frequent, depending on defrosting time.

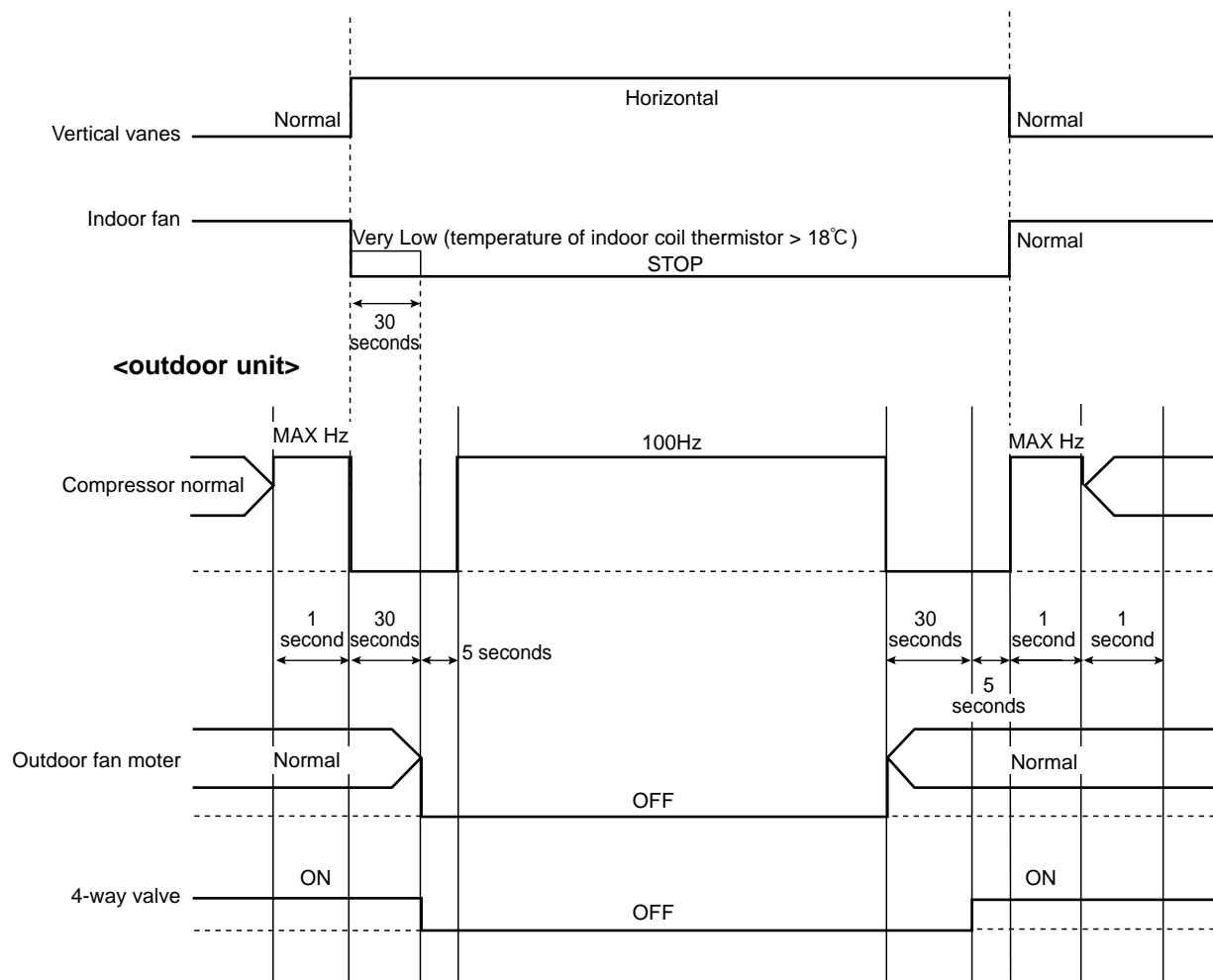
The third and subsequent defrost intervals follow any of the three patterns ...5 or 10 minutes longer, the same, or 5 or 10 minutes shorter compared with the previous defrost interval ... with the longest 115 minutes and the shortest 30 minutes.

(2) Releasing conditions of defrosting

Defrosting is released when any of the following condition is satisfied:

- The defrost thermistor reads 13°C or above.
- Defrosting time has exceeded 10 minutes.
- Some other mode than HEAT mode is set during defrosting.

### Time chart of defrosting in HEAT mode (reverse type)



## 9-2. COOL ( ❄ ) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button. POWER MONITOR lamp of the indoor unit turns on with a beep tone.
- (2) Select COOL mode with the OPERATION SELECT button.
- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.

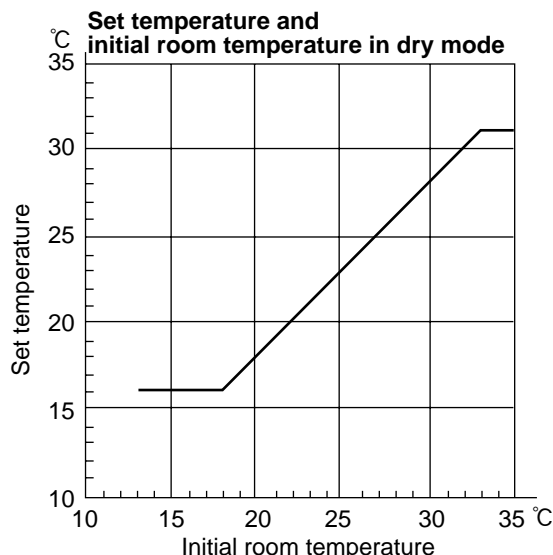
The setting range is 16 ~ 31°C

\* Indoor fan continues to operate regardless of thermostat's OFF-ON.

\* Coil frost prevention is same as COOL mode of "I FEEL CONTROL".

## 9-3. DRY ( ☀ ) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.  
POWER MONITOR lamp of the indoor unit turns on with a beep tone.
- (2) Select DRY mode with the OPERATION SELECT button.
- (3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
- (4) DRY operation will not work when the room temperature is 13°C or below.



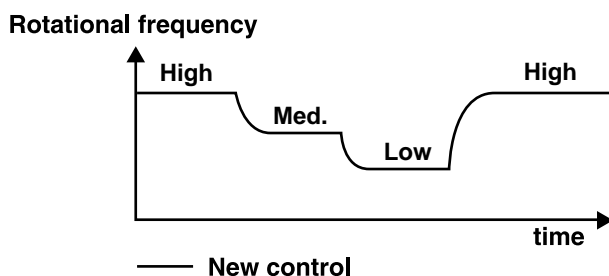
## 9-4. HEAT ( 🔥 ) OPERATION

- (1) Press OPERATE/STOP(ON/OFF) button.  
POWER MONITOR lamp of the indoor unit turns on with a beep tone.
- (2) Select HEAT mode with the OPERATION SELECT button.
- (3) Press TEMPERATURE buttons (TOO WARM or TOO COOL button) to select the desired temperature.  
The setting range is 16 ~ 31°C.

## 9-5. FAN MOTOR CONTROL

### 1. Rotational frequency feedback control

The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feed-back the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High, Med., Low) the microprocessor controls SR141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



### 2. Fan motor lock-up protection

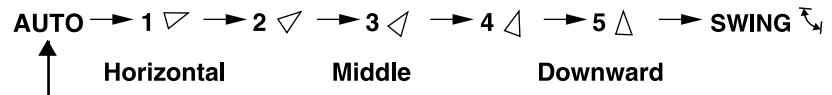
When the rotational frequency feedback signal is not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the POWER MONITOR lamp flashes to show the fan motor abnormality. (See page 42.)

## 9-6. AUTO VANE OPERATION

### 1. Vane motor drive

These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from indoor microprocessor.

### 2. The horizontal vane angle and mode changes as follows by pressing the VANE CONTROL button.



### 3. Positioning

The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle.

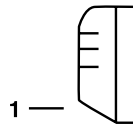
The positioning is decided as follows.

- When the OPERATE / STOP(ON / OFF) button is pressed.(POWER ON/OFF)
- When the vane control is changed AUTO to MANUAL.
- When the SWING is finished.
- When the test run starts.
- When the power supply turns ON.

### 4. VANE AUTO ( @ ) mode

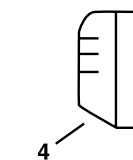
In VANE AUTO mode, the microprocessor automatically determines the vane angle and operation to make the optimum room-temperature distribution.

#### (1) In COOL and DRY operation



Vane angle is fixed to Angle 1.

#### (2) In HEAT operation



Vane angle is fixed to Angle 4.

### 5. Dew prevention

During COOL or DRY operation with the vane angle at Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

### 6 SWING MODE (↔)

By pressing the SWING button, vane swings horizontally. The remote controller displays "↔". SWING MODE is cancelled when any of the following operations are performed.

- The unit is turned off.  
The vertical vanes will return to their positions just before the swing operation was started.
- The operation mode(AUTO, COOL, DRY or HEAT)is changed.  
The vertical vanes will return to their positions just before the swing operation was started.
- The SWING button is pressed.  
The vertical vanes stop at the position when the button is pressed.

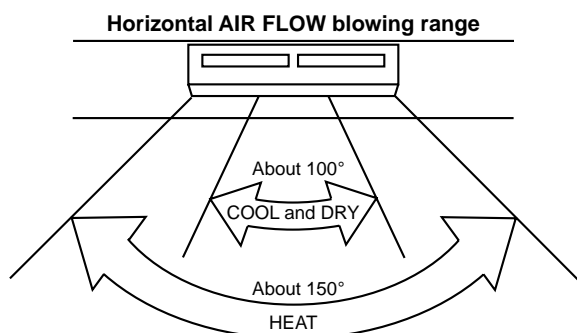
## 7 Horizontal AIR FLOW ( )

The vertical vane angle changes as follows by pressing the SWING button.

- Press the SWING button.  
The vertical vanes begin moving.
- When the vertical vanes move to the desired position, press the SWING button again.  
The vertical vanes stop moving.

### NOTE

If the SWING button is not pressed again within 30 seconds in COOL or DRY mode or within 1 minute in HEAT mode after the vertical vanes start moving, the vertical vanes will automatically return to their original positions.

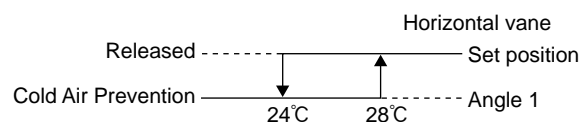


## 8. Cold air prevention in HEAT operation.

When any of the following conditions occurs in HEAT operation, the vane angle changes to Angle 1 automatically to prevent cold air blowing on users.

- ① Compressor is not operating.
- ② Defrosting is performed.
- ③ Indoor coil thermistor RT12 reads 24°C or below.
- ④ Indoor coil thermistor RT12 temperature is raising from 24°C or below, but it does not exceed 28°C.

Indoor coil thermistor RT12 temperature



NOTE: If the temperature of RT12 reads from 24°C to 28°C at the air conditioner starting, this control works.

## 9. ECONO COOL ( ) operation (ECONOMical operation)

When the ECONO COOL button is pressed in COOL mode, set temperature is automatically set 2°C higher than that in COOL mode.

Also the horizontal vane swings in various cycle according to the temperature of indoor heat exchanger(RT12).

SWING operation makes you feel cooler than set temperature. So, even though the set temperature is higher than that in COOL mode, the air conditioner can keep comfort. As a result, energy can be saved.

ECONO COOL operation is cancelled when the ECONO COOL button is pressed once again or VANE CONTROL button is pressed or change to other operation mode.

**NOTE** : ECONO COOL operation not work in COOL mode of "I FEEL CONTROL".

### SWING operation

In swing operation of ECONO COOL mode, the initial air flow direction is adjusted to "Horizontal".

According to the temperature of indoor coil thermistor RT12 at starting of this operation, next downward blow time is decided. Then when the downward blow has been finished, next horizontal blow time is decided.

For initial 10 minutes the swing operation is performed in table G~H for quick cooling.

Also, after 10 minutes when the difference of set temperature and room temperature is more than 2°C, the swing operation is performed in table D~H for more cooling.

The air conditioner repeats the swing operation in various cycle as follows.

	Temperature of indoor coil thermistor RT12	Downward blow time (sec.)	Horizontal blow time (sec.)
A	15°C or less	2	23
B	15°C to 17°C	5	20
C	17°C to 18°C	8	17
D	18°C to 20°C	11	14
E	20°C to 21°C	14	11
F	21°C to 22°C	17	8
G	22°C to 24°C	20	5
H	more than 24°C	23	2

## 9-7. TIMER OPERATION

### 1. How to set the timer

- (1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.
- (2) Check that the current time is set correctly.

**NOTE** : Timer operation will not work without setting the current time. Initially "AM0:00" blinks at the current time display of TIME MONITOR, so set the current time correctly with CLOCK SET button.

- (3) Press ON or OFF TIMER buttons to select the operation.

"⊕→|" button... AUTO START operation (ON timer)

"⊕→○" button... AUTO STOP operation (OFF timer)

- (4) Press HR. and MIN. button to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when "⊕→|" or "⊕→○" mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that POWER MONITOR lamp of the indoor unit lights.

**NOTE1** : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

**NOTE2** : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

### 2. Cancel

TIMER setting can be cancelled with the ON or OFF TIMER buttons. ("⊕→|" or "⊕→○")

To cancel the ON timer, press the "⊕→|" button.

To cancel the OFF timer, press the "⊕→○" button.

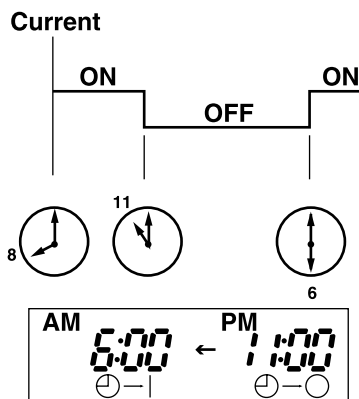
TIMER is cancelled and the display of set time disappears.

## PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.
- "→" and "←" display shows the order of the OFF timer and ON timer operation.

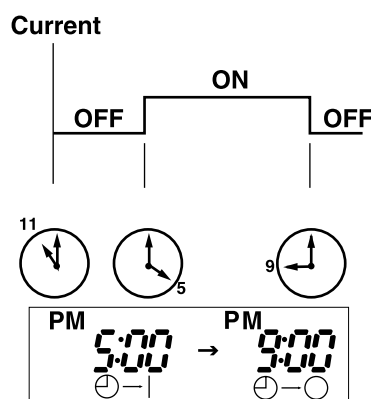
(Example 1) The current time is 8:00 PM.

The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.

The unit turns on at 5:00 PM, and off at 9:00 PM.



**NOTE** : TIMER setting will be cancelled by power failure or breaker functioning.

## 9-8. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the POWER MONITOR lamp will light.

The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)

After 30 minutes of test run operation the system shifts to EMERGENCY COOL/HEAT MODE with a set temperature of 24°C.

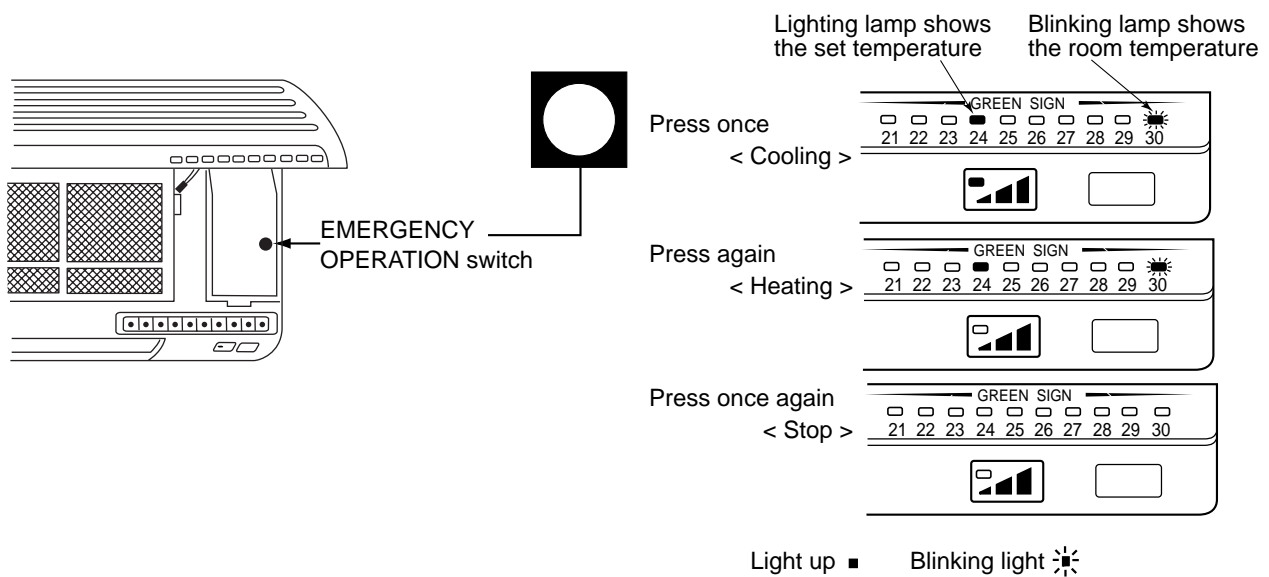
The fan speed shifts to Med. speed.

The coil frost prevention works even in emergency operation, and defrosting too.

In the test run or emergency operation, the horizontal vane operates in VANE AUTO mode.

Emergency operation continues until the EMERGENCY OPERATION switch is pressed once or twice or the unit receives any signal from the remote controller. In case of latter normal operation will start.

**NOTE :** Do not press the EMERGENCY OPERATION switch during normal operation.



## 9-9. POWER MONITOR LAMP

Color of the lamp	Operating condition
RED	The unit operates at high power.
ORANGE	The unit operates at middle power.
GREEN	The unit operates with energy-saving.

The color of POWER MONITOR lamp is GREEN in any of the following cases.

- When ON-timer is standby
- In DRY operation
- In EMERGENCY operation
- When defrosting of the outdoor unit is being done in HEAT operation



## 9-10. Operational frequency control of outdoor unit

### 1. Outline

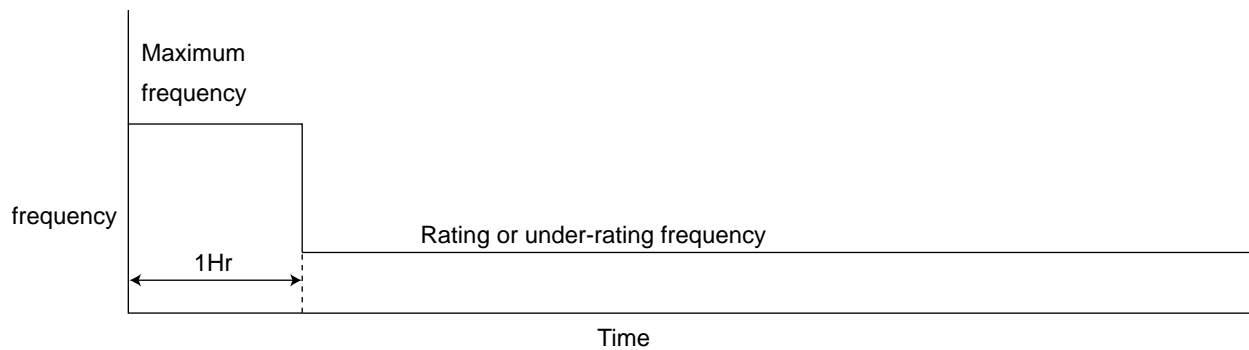
The operational frequency is decided by following the procedures below:

First, set the target operational frequency based on the difference between the room temperature and the set temperature. Second, regulate the target operational frequency by discharge temperature protection, high pressure protection, electric current protection and overload protection and also by the maximum/minimum frequency.

(1) maximum/ minimum frequency in each operation mode.

Model	COOL (indoor fan speed : High)			HEAT			DRY
	Minimum frequency	Rating frequency	Maximum frequency	Minimum frequency	Rating frequency	Maximum frequency	
MSZ-A09RV	15	53	80	16	67	98	22/27
MSZ-A12RV	15	82	88	16	98	115	22/27

※ The maximum frequency in COOL mode is limited according to operation hours, as shown below.



(2) Frequency change speed

During increasing frequency

Operational frequency	MUZ-A09RV-[E1] MUZ-A12RV-[E1]
10Hz to 14Hz	0.5 sec./Hz
15Hz to 79Hz	5 sec./Hz
80Hz to 150Hz	0.5 sec./Hz

During decreasing frequency

Operational frequency	MUZ-A09RV-[E1] MUZ-A12RV-[E1]
10Hz to 42Hz	1 sec./Hz
43Hz to 150Hz	0.5 sec./Hz

## 9-11 .Electronic expansion valve control (LEV control)

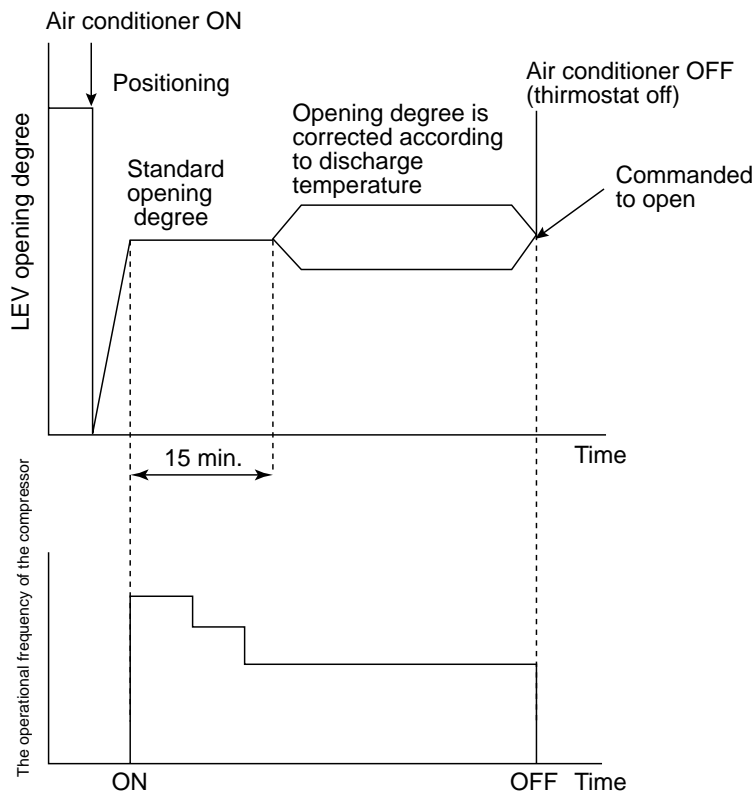
### (1)Outline of LEV control

The LEV basic control is comprised of setting LEV opening degree to the standard opening degrees set for each operational frequency of the compressor. However, when any change in indoor/outdoor temperatures or other factors cause air conditioning load fluctuation, the LEV control also works to correct LEV opening degree based on discharge temperature (Shell temperature) of the compressor, developing the unit's performance.

### (2)Specification of LEV control

standard specification	Control range	from min. 33 pulse to max. 500 pulse.
	Actuating speed	LEV opens 40 pulse/sec. and close 90 pulse/sec.
	Opening degree adjustment	LEV opening degree is always adjusted in opening direction. (When reducing the opening degree, LEV is once over-closed, and then adjusted to the proper degree by opening.
general operation	Unit OFF	LEV remains at max. opening degree (reaches max. opening degree approx. 15 minutes after compressor stops)
	Remote controller ON	LEV is positioned. (first full-closed at zero pulse and then positioned.)
	During 2 to 15 minutes after compressor starts	Opening degree is adjusted according to standard opening degree. (Standard opening degree is set for each rotational frequency of compressor)
	More than 15 minutes have passed since compressor start-up	LEV opening degree is corrected to get target discharge temperature of compressor. (For discharge temperature lower than target temperature, LEV is corrected in closing direction.) (For discharge temperature higher than target temperature, LEV is corrected in opening direction.) *It may take more than 30 minutes to reach target temperature, depending on operating conditions.
	Thermostat OFF	LEV starts to open every 3 pulse/sec. from the same opening degree as that when the Unit turned IFF (and becomes full-opened after approx. 15 minutes.)
	Thermostat ON	LEV is controlled in the same way as that is after the compressor has started up.
	Defrosting in HEAT mode	LEV is adjusted to open 350 pulse.

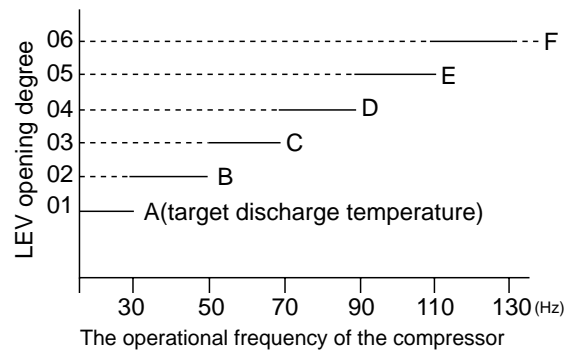
### (3) Time chart



### (4) Control data

(a) Reference value of target discharge temperature  
(Cooling °C/Heating °C)

A	B	C	D	E	F
58/49	60/58	68/67	70/70	72/72	72/72



In COOL mode, the two indoor coil thermistor (one main and one sub) sense temperature ununiformity (super heat) at the heat exchanger, and when temperature difference have developed, the indoor coil thermistors adjust LEV opening to get approximate 10 degrees lower temperature than the target temperature in the table above, thus diminishing super heat.

(b) Reference value of LEV standard degree opening  
(COOL/HEAT pulse)

01	02	03	04	05	06
110/80	150/100	200/120	200/130	200/130	200/130

## 9-12. Outdoor fan motor control

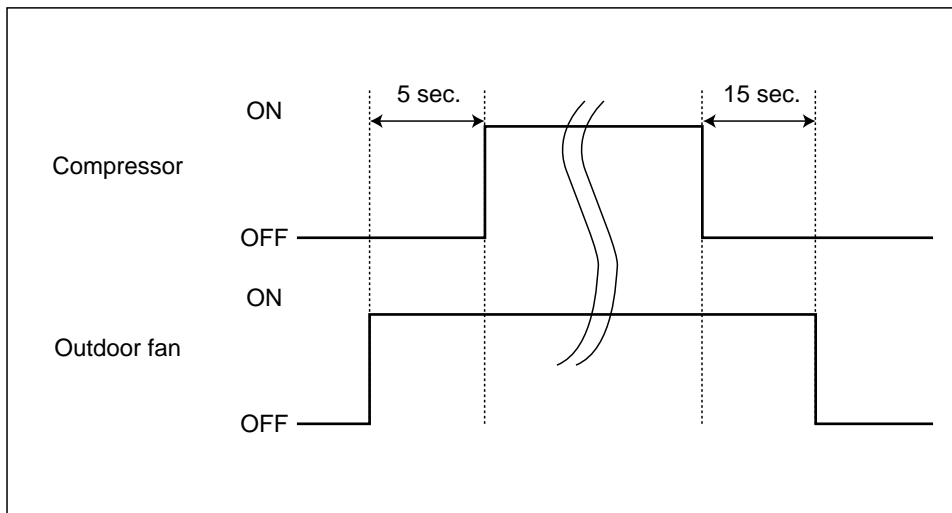
The AC fan motor turns ON/OFF, interlocking with the compressor.

[ON]

The AC fan motor turns on 5 seconds before the compressor starts up.

[OFF]

The AC fan motor turns off 15 seconds after the compressor stops running.



## 9-13. 4-way valve control

COOL&DRY mode ······ ON(voltage applied)

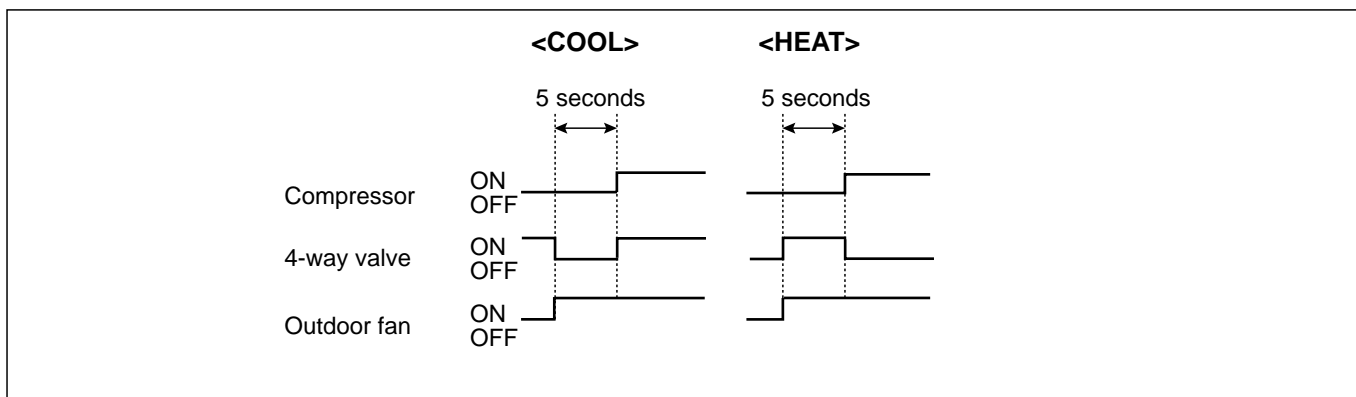
The 4-way valve turns ON as soon as thermostat turns ON.

The 4-way valve turns OFF 15 minutes after the thermostat turns OFF.

HEAT mode ······ OFF(voltage not applied)

During normal HEAT operation the 4-way valve is OFF.

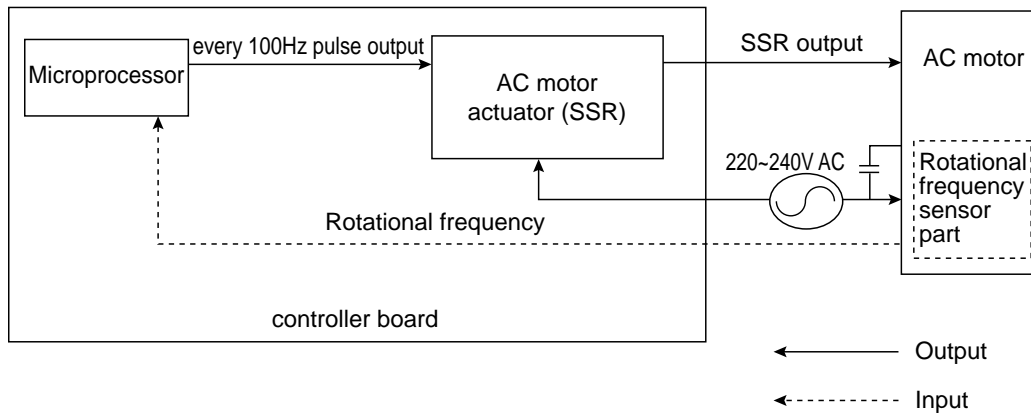
※ The 4-way valve does not turn ON before the compressor starts up.



## 9-14. Indoor fan motor control

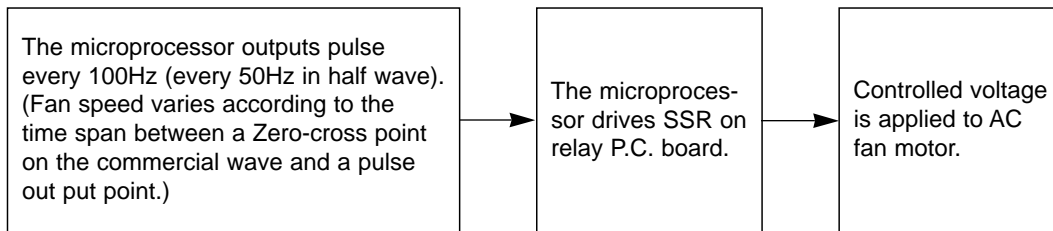
The detected rotational frequency of the fan motor is feed backed to the microprocessor and then the microprocessor works to keep the rotational frequency at a fixed value against load fluctuation.

### (1) Circuit block diagram

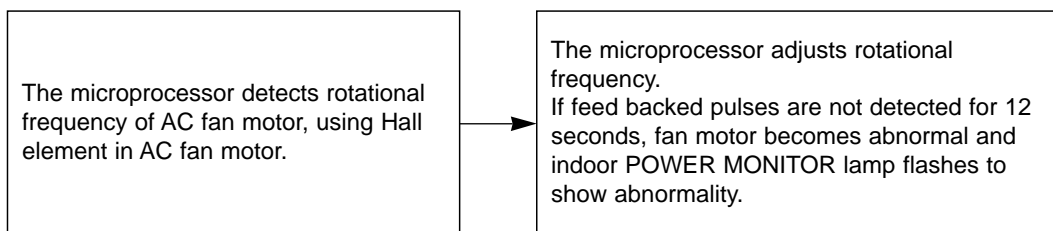


### (2) Control system

#### <Output side>



#### <Input side>



MSZ-A09RV -[E1] MUZ-A09RV -[E1]

MSZ-A12RV -[E1] MUZ-A12RV -[E1]

**10-1. CHANGE IN DEFROST SETTING**

<JP7> When the JP7 wire of the outdoor electronic control P.C. board is cut, the defrost temperature will be changed.  
(Refer to page 55.)

Jumper wire	Change point
JP7	Deforst finish temperature changes from 13℃ to 15℃.

**10-2. TIMER SHORT MODE**

For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.

The time will be shortened as follows. (Refer to page 54.)

Set time : 1 minute → 1-second

Set time : 3 minute → 3-second (It takes 3 minutes for the compressor to start operation. However, the starting time is shortened by short circuit of JPG and JPS.)

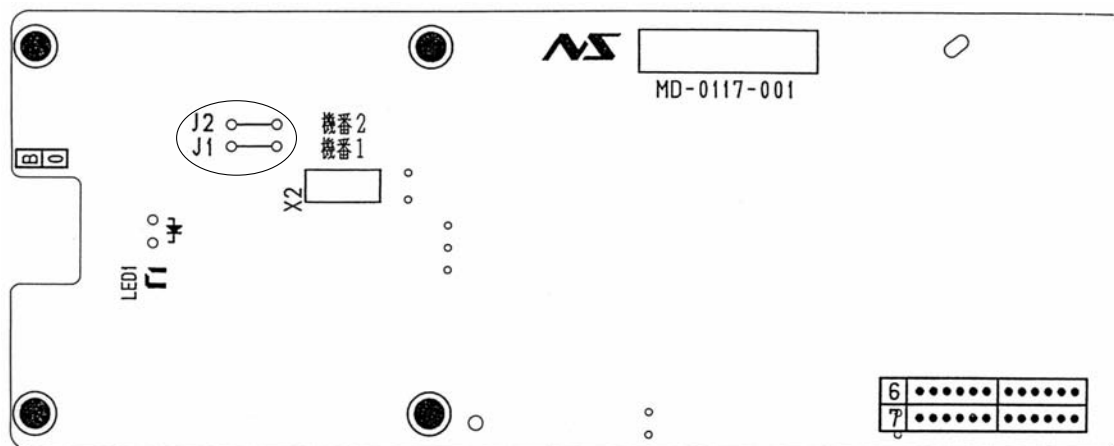
**10-3. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION**

A maximum of 4 indoor units with wireless remote controllers can be used in a room. In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the indoor unit number.

**How to modify the remote controller P.C. board**

Remove batteries before modification.

The board has a print as shown below;



**NOTE :** Fore re-modelling, take out the batteries at first.

After finish re-modelling, put back the batteries then push the RESET-button.

The P.C. board has the print "J1" and "J2". Jumper wires are mounted to each "J1" and "J2". Cut "J1" and "J2" according to the number of indoor unit as shown in Table 1.

After modification, push the RESET. button near the MIN-button on the remote controller.

Table1.

	1 unit operation	2 unit operation	3 unit operation	4 unit operation
No.1 unit	No modification	Same as at left	Same as at left	Same as at left
No.2 unit	_____	Cut J1	Same as at left	Same as at left
No.3 unit	_____	_____	Cut J2	Same as at left
No.4 unit	_____	_____	_____	Cut both J1 and J2

**How to set the remote controller exclusively for particular indoor unit**

After you turn the breaker ON, the first remote controller that sends the signal to the indoor unit will be regarded as the remote controller for the indoor unit.

The indoor unit will only accepts the signal from the remote controller that has been assigned to the indoor unit once they are set.

The setting will be cancelled if the breaker has turned off, or the power supply has shut down.

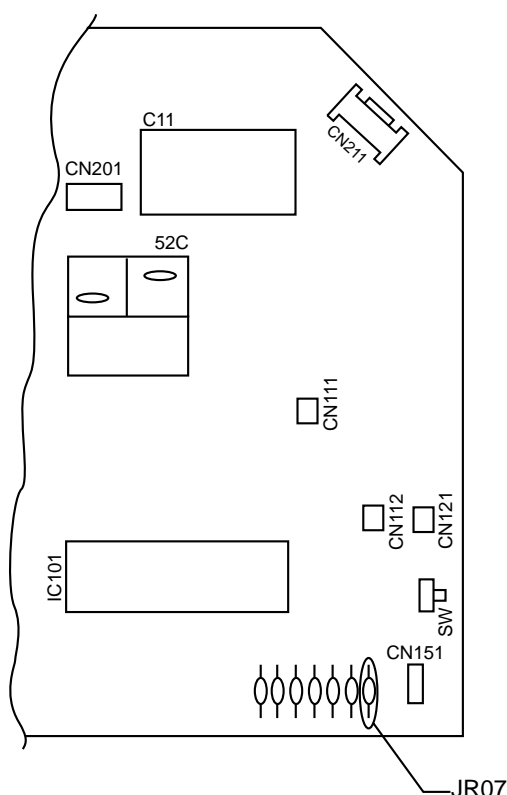
Please conduct the above setting once again after the power has restored.

## 10-4. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, the set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The "AUTO RESTART FUNCTION" sets to work the moment the power has restored after power failure, then, the unit will restart automatically. If the unit is operated in "I FEEL CONTROL" mode before power failure, the operation is not memorized. In "I FEEL CONTROL" mode, the operation is decided by the initial room temperature at (re)start.

### How to set "AUTO RESTART FUNCTION"

- ① Turn off the main power for the unit.
- ② Remove the indoor electronic control P.C. board and the display P.C.board.(See page 57.)
- ③ Pull the indoor electronic control P.C. board forward and cut the RESISTOR JR07 on it.



### Operation

- ① If the main power (220-240V AC) has been cut, the operation settings remain.
- ② After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

### NOTE:

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If the main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart. Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

MSZ-A09RV -[E1] MUZ-A09RV -[E1]

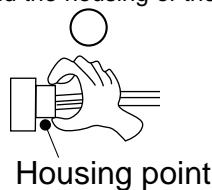
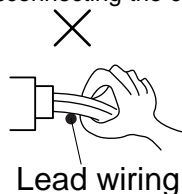
MSZ-A12RV -[E1] MUZ-A12RV -[E1]

**11-1. Cautions on troubleshooting****1. Before troubleshooting, check the following:**

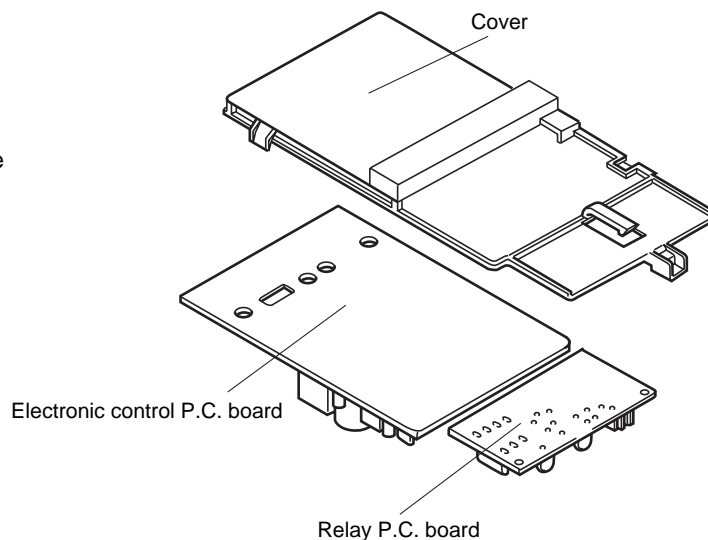
- 1) Check the power supply voltage.
- 2) Check the indoor/outdoor connecting wire for mis-wiring.

**2. Take care the following during servicing.**

- 1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
- 2) Be sure to unplug the power cord before removing the front panel, the cabinet, the top panel, and the P.C. boards.
- 3) When removing the P.C. board, hold the edge of the board with care NOT to apply stress on the components.
- 4) When connecting or disconnecting the connectors, hold the housing of the connector, DO NOT pull the lead wires.

**3. Caution for the outdoor unit repair service**

- 1) Do not load on the P.C.board cover.
- 2) Since every P.C.board circuit links directly with power supply 220~240V AC, do not short the P.C.board and metal section on servicing. Also if touch the parts on the P.C.board, it may cause an electric shock.
- 3) When closing the P.C.board cover, prevent a foreign matter or dust from coming inside the P.C.board.

**3. Troubleshooting procedure**

- 1) First, check if the POWER MONITOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
- 2) Before servicing check that the connector and terminal are connected properly.
- 3) If the P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
- 4) When troubleshooting, refer to the flow chart on page 41 and the check table on page 42 and 43.

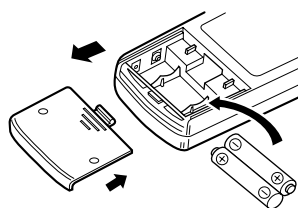
**4. How to replace batteries**

Weak batteries may cause the remote controller malfunction.

In this case, the remote controller can not be repaired only by the battery replacement. To operate the remote controller normally, replace the batteries in the following order.

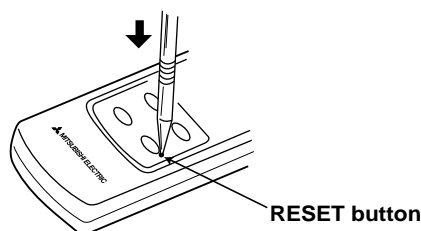
This remote controller has the RESET button. After refilling new batteries, press the RESET button with tip end of ball point pen or the like, and then use the remote controller.

- ① Remove the back lid and replace batteries.  
Then re-attach the back lid.



Insert the negative pole of the batteries first. Check if the polarity of the batteries is correct.

- ② Press the RESET button.

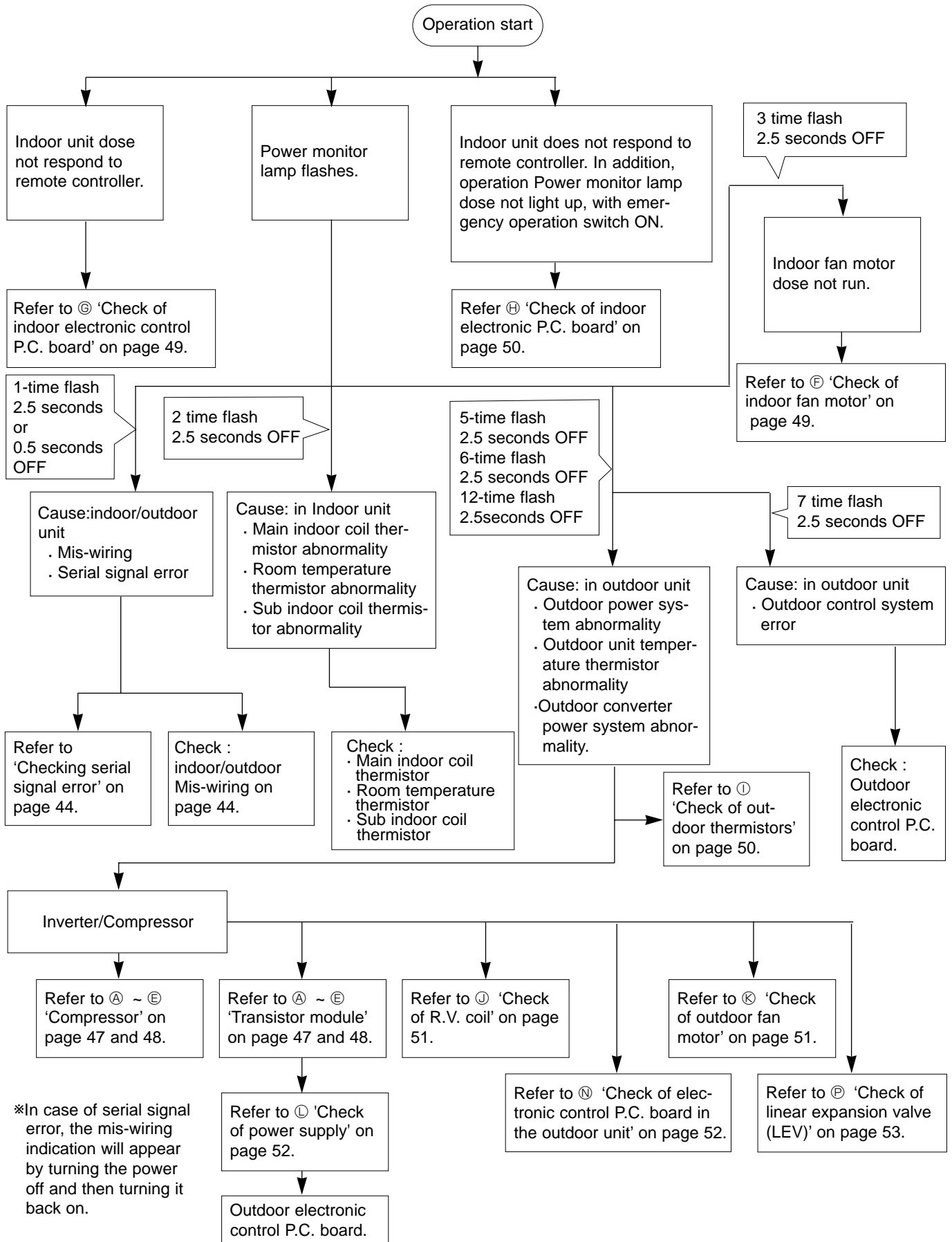




## 11-2. Troubleshooting procedure

The following procedure facilitates identifying defective points.

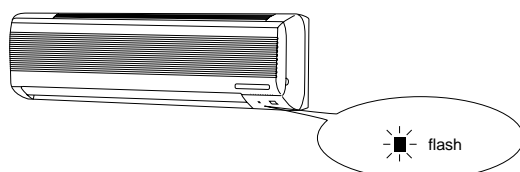
The abnormalities in □ can be located in the Troubleshooting check table on page 42~43.



# 1. Troubleshooting check table (Indoor unit troubleshooting check table)

MSZ-A09RV -[E1]

MSZ-A12RV -[E1]



- Flashing of the POWER MONITOR lamp indicates possible abnormalities.
- The POWER MONITOR lamp is lighting during normal operation.

No.	Symptom	POWER MONITOR lamp	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	repeated flashes every 0.5 seconds	Mis-Wiring	When indoor electronic control P.C. board does not receive serial signals for 4 to 5 seconds with OPERATION/STOP(ON/OFF) button of remote controller ON and 52C relay ON for the first time, NOTE: In case of serial signal error, mis-wiring indication will appear by turning power off and then turning it back on.	Refer to 'Checking serial signal error' on page 44.
※2		1-time flash 2.5 seconds OFF	Serial signal	When indoor electronic control P.C. board does not receive serial signals from outdoor unit for 4 to 5 seconds.	
※3		2-time flash 2.5 seconds OFF	Main indoor coil thermistor Sub indoor coil thermistor Room temperature thermistor	Indoor electronic control P.C. board constantly detects resistance every 8 seconds. When thermistor shorts or opens.	Refer to the characteristics of main indoor coil thermistor, sub indoor coil thermistor and room temperature on page 54.
※4		3-time flash 2.5 seconds OFF	Indoor fan motor	When rotational frequency feedback signal is not emit during 12-second indoor fan operation.	Refer to ⑤ "Check of indoor fan motor" on page 49.
5		5-time flash 2.5 seconds OFF	Outdoor power system	When compressor has stopped due to overcurrent protection or start-up failure protection 3 times in a row within 1 min. after start-up.	Refer to "How to check inverter/compressor" on page 47.
6		6-time flash 2.5 seconds OFF	Outdoor thermistors	<Thermistor short> Thermistors are abnormal when they short after compressor start-up. <Thermistor open> Thermistors are abnormal when they open after compressor start-up. However, discharge temperature thermistor is abnormal when open circuit is detected more than 10 min. after compressor start-up.	· Shortage of refrigerant · Outdoor electronic control P.C. board  Refer to ① "Check of outdoor thermistors" on page 50.
7		7-time flash 2.5 seconds OFF	Outdoor control system	When nonvolatile memory data cannot be read properly on outdoor electronic control P.C. board, outdoor unit stops and restarts 3 minutes later,	Replace outdoor electronic control P.C. board.
8		12-time flash 2.5 seconds OFF	Converter power system	When the converter protective suspension within 1 minute after start-up of the converter is operated 5 times successively. Also bus-bar voltage malfunction (140V or less or 400V or more) within 1 minute after start-up of the converter has happened 5 times successively.	Refer to ⑧ "Check of outdoor electronic control P.C.board" on page 52.

※When the indoor unit has started operation and the above detection method has detected an abnormality (the first detection after the power ON), the electronic control P.C. board turns OFF the 52C and the indoor fan motor with the operation indicator lamp lighting.

When the 52C and the indoor fan motor are turned ON again 3 minutes later and the same abnormality is detected (a second detection of the above abnormality after the power ON), the control P.C. board turns OFF the 52C and the indoor fan motor with the operation indicator lamp flashing.

However, the first detection is cleared in case the power is turned OFF after the first detection.

# (Outdoor LED indication table)

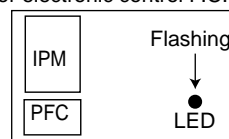
MUZ-A09RV -E1

MUZ-A12RV -E1

NOTE 1. The location of LED is illustrated at the right figure.

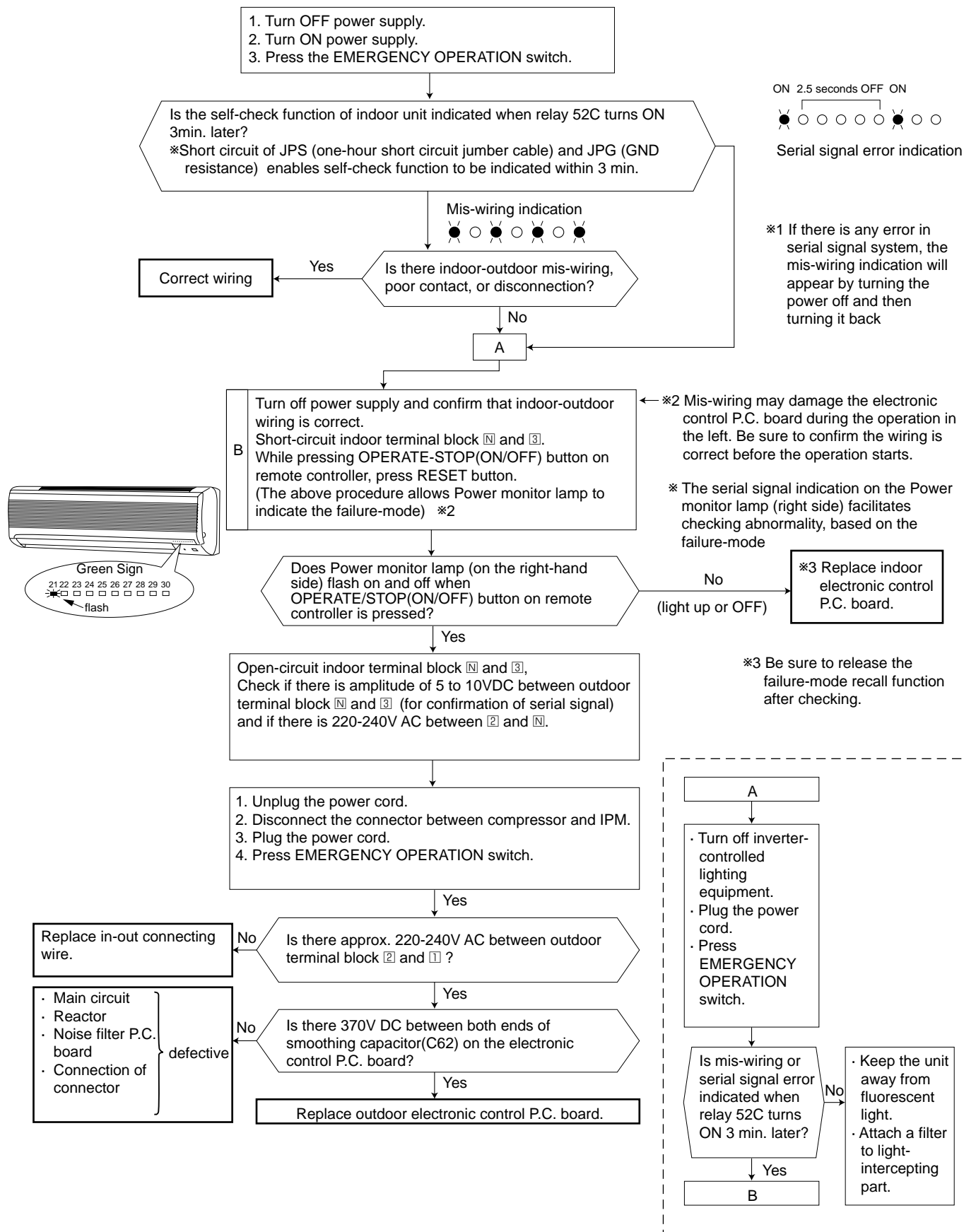
2. LED lights up during normal operation.

<Outdoor electronic control P.C. board>



No.	Symptom	LED indication	Abnormal point	Detection method	Checkpoint
1	Outdoor unit does not operate	1-time flash every 2.5 seconds	Converter power system	When the converter protective suspension within 1 minute after start-up of the converter is operated 5 times successively. Also bus-bar voltage malfunction (140V or less or 400V or more) within 1 minute after start-up of the converter has happened 5 times successively.	Refer to ⑧ 'Check of electronic control P.C. board on page 52.
2			Outdoor power system	When compressor has stopped by overcurrent protection or start-up failure protection within 1 min. after compressor start-up 3 times in a row, compressor stops and then restarts 3 min. later.	Refer to 'Checking inverter/ compressor on page 47.
3			Outdoor thermistors	When discharge temperature thermistor or fin temperature thermistor shorts or opens during compressor running, compressor stops and restarts 3 min. later.	Refer to ① 'Check of outdoor thermistors' on page 50.
4			Outdoor control system	When nonvolatile memory data cannot be read properly, compressor stops and restarts 3 min. later.	Replace outdoor electronic control P.C. board.
5	'Outdoor unit stops and restarts 3 min. later' is repeated	2-time flash 2.5 seconds OFF	Over current protection	When 19A current flows into power transistor, compressor stops and restarts 3 min. later.	Refer to ④-⑤ in 'How to check inverter/ compressor' on page 47~ 48.
6		3-time flash 2.5 seconds OFF	Discharge temperature overheat protection	When discharge temperature thermistor exceeds 116°C, compressor stops and restarts 3 min. later. (Compressor restarts when discharge temperature thermistor reads 100°C or below.)	Check refrigerant circuit and refrigerant amount. Refer to ① 'Check of outdoor thermistor' on page 50.
7		4-time flash 2.5 seconds OFF	Fin temperature thermistor overheat protection	When temperature at heat sink exceeds 88°C or outdoor electronic control P.C. board exceeds 67°C, compressor stops and restarts 3 min. later.	Check around outdoor unit. Check outdoor unit air passage.
8		5-time flash 2.5 seconds OFF	High pressure protection	When indoor coil thermistor exceeds 75°C, compressor stops and restarts 3 min. later.	Check refrigerant circuit and refrigerant amount. Check stop valve.
9		7-time flash 2.5 seconds OFF	Mis-start up protection	When switching from forced drive to normal drive (synchronised operation by a position detectable signal) failed 5 times successively at compressor start-up. Restart-up after suspension when miss start-up or abnormal position detecting within 10 seconds after start-up.	Check and replace as follows. 1 Check the compressor connecting lead wire between connector and transistor module. 2 Check outdoor electronic control P.C. board. (Position detecting circuit IPM, Micro computer, etc) 3 Compressor replacement Refer to ④-⑤ Inverter Compressor simple check method on page 47 and 48.
10		8-time flash 2.5 seconds OFF	Position detection protection	When the position detectable signal is not input during normal starting up (synchronised operation by a position detectable signal) after 10 seconds of compressor operation.	
11	Outdoor unit operates (at low frequency)	1-time flash 2.5 seconds OFF	Frequency drop by current protection	When current from power outlet exceeds 10. A, compressor frequency lowers.	The unit is normal, but check the following. Check if indoor filters are clogged Check if refrigerant is short. Check if indoor/outdoor unit air outlets are short cycled.
12		3-time flash 2.5 seconds OFF	Frequency drop by high pressure protection	When indoor coil thermistor exceeds 55°C in HEAT mode, compressor frequency lowers.	
			Frequency drop by defrosting in COOL mode	When indoor coil thermistor reads 8°C or below in COOL mode, compressor frequency lowers.	
13		4-time flash 2.5 seconds OFF	Frequency drop by, discharge temperature protection	When discharge temperature thermistor exceeds 111°C, compressor frequency lowers.	Refer to ① 'Check of outdoor thermistors' on page 50.
14	Outdoor unit operates	5-time flash 2.5 seconds OFF	Outdoor thermistors Defrost thermistor	When defrost thermistor short or open. * In this case, compressor continues running.	Refer to ① 'Check of outdoor thermistors' on page 50.
15		7-time flash 2.5 seconds OFF	low discharge temperature protection	When discharge temperature has been 50°C or below for 20 min.	Refer to ⑥ 'Check of LEV' on page 53. Check refrigerant circuit and refrigerant amount.
16		8-time flash 2.5 seconds OFF	Converter protection	When the converter suspends for protection •Response abnormal suspension •Bus-bar voltage abnormal suspension •Converter overcurrent/ over voltage protective suspension •Converter current detection abnormal suspension •Converter zero cross abnormal suspension	Refer to ⑧ 'Check of electronic control P.C. board on page 52.
17		9-time flash 2.5 seconds OFF	Inverter check mode	When disconnecting the compressor connector, going to inverter check mode.	Refer to ④-⑤ Inverter Compressor simple check method on page 47 and 48.

Outdoor unit does not operate. When the POWER MONITOR lamp (on the left-hand side) flashes on and off continuously or only once.

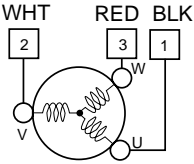
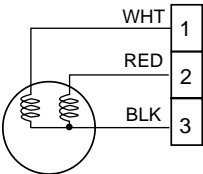


### 3. Trouble shooting procedure of main parts

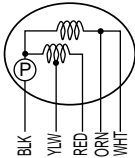
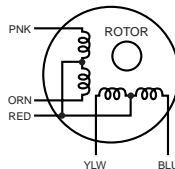
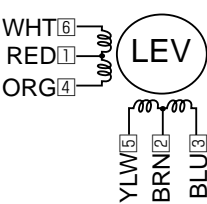
#### (Simple check method of main parts)

MSZ-A09RV -[E1] MUZ-A09RV -[E1]

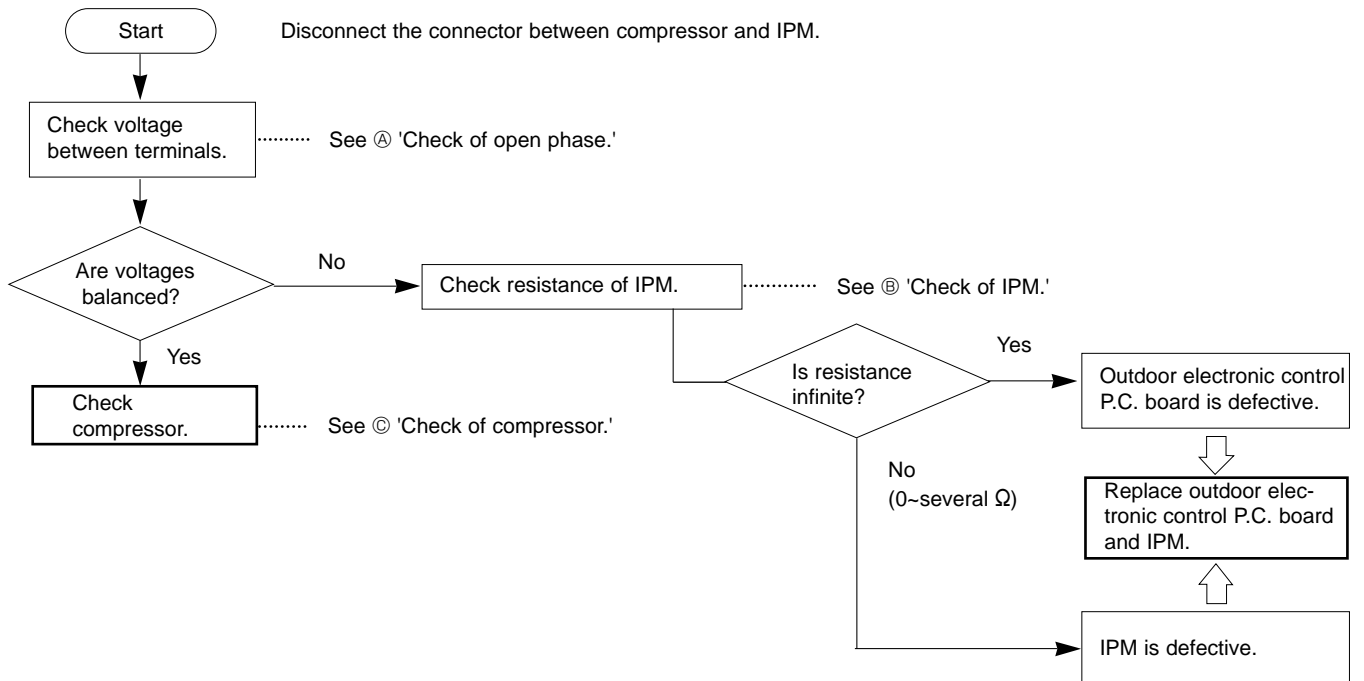
MSZ-A12RV -[E1] MUZ-A12RV -[E1]

Part name	Checking method and criterion	
Room temperature thermistor(RT11)	Disconnect the connector and measure the resistance with a tester. (Part temperature : 10°C ~30°C )	
Indoor coil thermistor (RT12,RT13)		
	Normal	Abnormal
	8kΩ~20KΩ	Open or short circuit
Defrost thermistor (RT62)	Disconnect the connector and measure the resistance with a tester. (Part temperature : -10°C ~40°C )	
	Normal	Abnormal
	5kΩ~55KΩ	Open or short circuit
Discharge temperature thermistor (RT61)	Disconnect the connector and measure the resistance with a tester. Before measurement, hold the thermistor with your hands to warm it up. (Part temperature : 20°C ~40°C )	
	Normal	Abnormal
	100kΩ~250KΩ	Open or short circuit
Fin temperature thermistor (RT64)	Disconnect the connector and measure the resistance with a tester. (Part temperature : -10°C ~80°C )	
	Normal	Abnormal
	5kΩ~30KΩ	Open or short circuit
Compressor (MC)	Disconnect the connector and measure the resistance between the terminals with a tester. (Winding temperature : -10°C ~40°C )	
 <p>Compressor motor</p>		
	Normal	Abnormal
	0.82Ω~1.01Ω	Open or short circuit
Indoor fan motor(MF)	Measure the resistance between the terminals with a tester. (Winding temperature : 10°C ~30°C )	
		
	Terminal (CN211)	Normal
	WHT-BLK	280Ω~304Ω
	BLK-RED	311Ω~338Ω
		Open or short circuit



Part name	Checking method and criterion										
<div>Outdoor fan motor(MF61)</div> <div></div>	<div>Measure the resistance between the terminals with a tester. (Winding temperature : -10℃~40℃)</div> <div><table><tr><th>Terminal</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>173.7Ω~212.6Ω</td><td rowspan="3">Open or short circuit</td></tr><tr><td>BLK-RED</td><td>277.8Ω~339.9Ω</td></tr><tr><td>YLW-BLK</td><td>11.4Ω~14.1Ω</td></tr></table></div>	Terminal	Normal	Abnormal	WHT-BLK	173.7Ω~212.6Ω	Open or short circuit	BLK-RED	277.8Ω~339.9Ω	YLW-BLK	11.4Ω~14.1Ω
Terminal	Normal	Abnormal									
WHT-BLK	173.7Ω~212.6Ω	Open or short circuit									
BLK-RED	277.8Ω~339.9Ω										
YLW-BLK	11.4Ω~14.1Ω										
<div>Horizontal vane motor(MV1) Vertical vane motor(MV2)</div> <div></div>	<div>Measure the resistance between the RED terminal and the other ones. (Winding temperature : 20℃~30℃)</div> <div><table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>approx. 300Ω in each phase</td><td>Open or short circuit.</td></tr></table></div>	Normal	Abnormal	approx. 300Ω in each phase	Open or short circuit.						
Normal	Abnormal										
approx. 300Ω in each phase	Open or short circuit.										
<div>R.V. coil (21S4)</div>	<div>Measure the resistance between the terminals with a tester. (Part temperature : -10℃~40℃)</div> <div><table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>882Ω~1079Ω</td><td>Open or short circuit.</td></tr></table></div>	Normal	Abnormal	882Ω~1079Ω	Open or short circuit.						
Normal	Abnormal										
882Ω~1079Ω	Open or short circuit.										
<div>Linear expansion valve (LEV)</div> <div></div>	<div>Measure the resistance with a tester. (Part temperature : -10℃~40℃)</div> <div><table><tr><th>Terminal (CN724)</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-RED</td><td rowspan="4">42 ~52Ω</td><td rowspan="4">Open or short circuit</td></tr><tr><td>RED-ORN</td></tr><tr><td>YLW-BRN</td></tr><tr><td>BRN-BLU</td></tr></table></div>	Terminal (CN724)	Normal	Abnormal	WHT-RED	42 ~52Ω	Open or short circuit	RED-ORN	YLW-BRN	BRN-BLU	
Terminal (CN724)	Normal	Abnormal									
WHT-RED	42 ~52Ω	Open or short circuit									
RED-ORN											
YLW-BRN											
BRN-BLU											

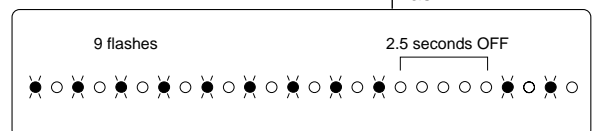
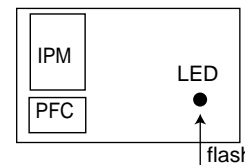
## (How to check inverter/compressor)



### A Check of open phase

- Be sure to use the analog voltmeter for measurement
  - Disconnect the connector between compressor and IPM, activate the inverter and measure the balance of voltage between terminals.
- Output voltage : 120V
- << Operation method >>  
Start heating operation by pressing the Emergency operation switch on the indoor unit. (test-run mode)
- << Measurement point >>  
at 3 points  
BLK-WHT  
BLK-RED  
WHT-RED
- NOTE Measure AC voltage, at 3 points more than one minute after the outdoor fan motor starts running.

#### <Outdoor electronic control P.C. board>



- Note 1. Output voltage changes depending power supply voltage. (Max.  $\pm 10\%$ )
2. Measure by analogue tester.
3. During the measurement, LED in the outdoor electronic control P.C. board flashes 9 times.

### B Check of IPM

- Disconnect the connector between compressor and IPM, and measure resistance between terminals on the IPM.
- << Measurement point >>  
at 6 points  
BLK-WHT, WHT-BLK  
BLK-RED, RED-BLK  
WHT-RED, RED-WHT
- \* Measure resistance between the lead wires at 3 points
- << Judgment >>  
Infinite [ $\Omega$ ] ..... normal  
0~dozens of ..... abnormal (short)

#### ohmmeter indication

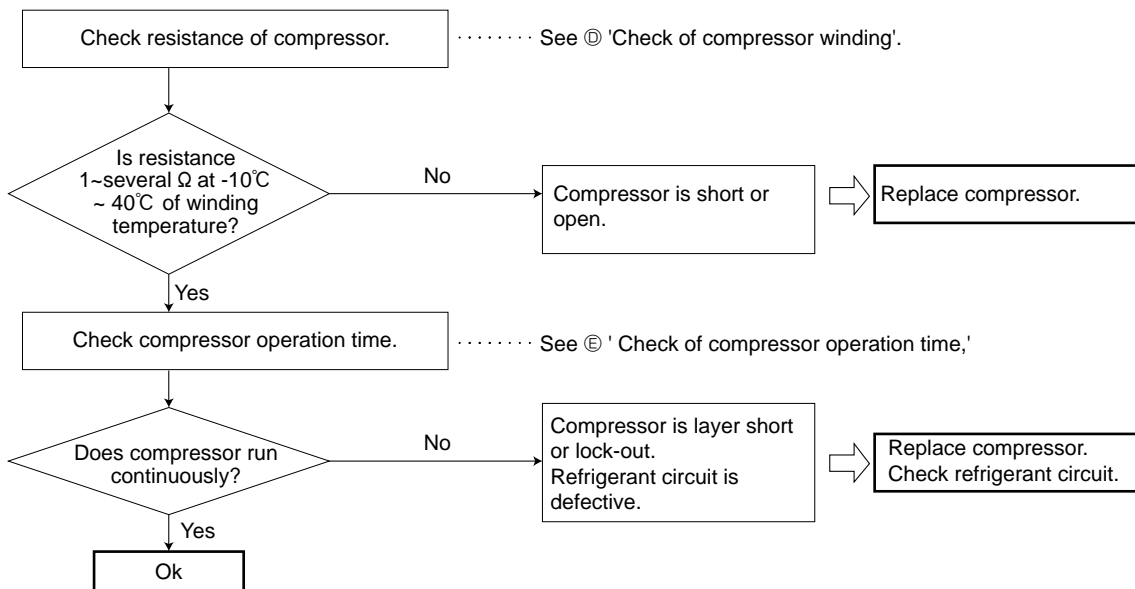


..... Normal (infinite)



..... Abnormal (0~dozens of  $\Omega$ )

### C Check of compressor



### D Check of compressor winding

- Disconnect the connector between compressor and IPM, and measure resistance between the compressor terminals.

<<Measurement point>>

at 3 points

BLK-WHT

BLK-RED

WHT-RED

※ Measure resistance between the lead wires at 3 points.

<<Judgment>>

0.82 to 1.01 $\Omega$  at  $-10^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  of part temperature.

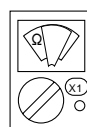
0[ $\Omega$ ] .....abnormal [short]

Infinite[ $\Omega$ ] .....abnormal [open]

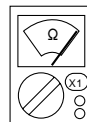
NOTE 1.Be sure to zero the ohmmeter before measurement.

2.Winding resistance for each phase is 0.45 $\Omega$  at  $20^{\circ}\text{C}$ .

#### Ohmmeter indication



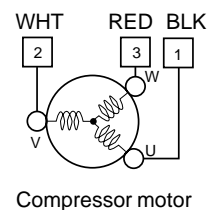
..... Normal (1~several  $\Omega$ )



..... Abnormal (0 $\Omega$  ..... short)



..... Abnormal (infinite..... open)



### E Check of compressor operation time

- Connect the compressor and activate the inverter. Then measure the time until the inverter stops due to overcurrent.

<<Operation method>>

Start heating or cooling operation by pressing the emergency operation switch on the indoor unit. (Test-run mode)

<<Measurement>>

Measure the time from the start of outdoor fan running till the stop of the inverter due to overcurrent.

<<Judgment>>

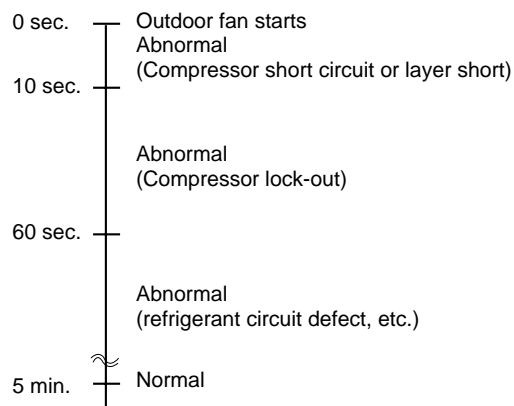
For reference

0~10 seconds.....abnormal (short)

10~60 seconds.....abnormal (compressor lock-out)

60 seconds~5 minutes.....abnormal (refrigerant circuit defect)

more than 5 minutes.....normal





(How to check main parts)

## F Check of indoor fan motor

Indoor fan does not operate.

Turn off power supply and check connector CN 211 visually.

Are lead wires disconnected?

No

Yes

Re-connect lead wires.

Is soldered point abnormal?

Yes

Re-solder it.

Disconnect lead wires from CN 211 on indoor electronic control P.C. board. Measure resistance between lead wire ① and ③ and then ② and ③.

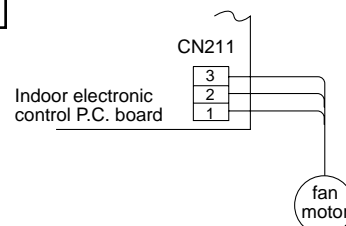
No

Replace indoor fan motor.

Is resistance 0Ω (short) or Ω (open) ?

No

Replace indoor electronic control P.C. board.



## G Check of remote controller and indoor electronic control P.C. board.

Indoor unit operates by pressing the emergency operation switch.

Check the model name of remote controller.

Is LCD display on remote controller visible?

No (not clear)

Replace batteries and then press RESET button. See page 40.

Remove batteries, then set them back and press the reset button.

Does the unit operate with remote controller?

No

Tune a radio in to AM and press OPERATE/STOP (ON/OFF) button on remote controller.

Is noise heard from the radio?

No

Replace remote controller.

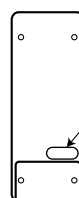
Are there any fluorescent lights of inverter or radio start type within 1 meter?

Yes

● Re-install the unit away from the lights.  
● Attach a filter to light-intercepting part.

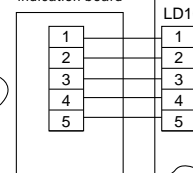
Replace the indoor electronic control P.C. board with power monitor, receiver P.C. board.

(Back side of remote controller)



Model name and part No. are written here.

light-interception indication board



## H Check of indoor electronic P.C. board

The unit does not operate with the remote controller. The POWER MONITOR lamp does not light up either, with the Emergency operation switch on.

Check both "parts side" and "pattern side" of indoor electronic control P.C. board visually.

Turn off the power supply.  
Remove indoor fan motor connector CN211 and vane motor connector CN151 from the indoor electronic control P.C. board and turn on the power supply.

Does the unit operate with the remote controller?  
Does the POWER MONITOR lamp light up by pressing the emergency operation switch?

Yes → Replace the vane motor.

Is winding resistance of vane motor 0 Ω?  
Be sure to check both resistance.

Is winding resistance of fan motor 0 Ω?

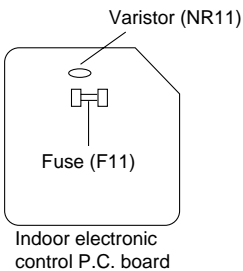
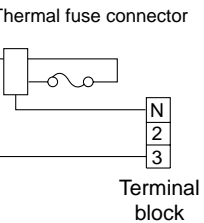
Yes → Replace the fan motor.

Replace the fuse.

Is fuse(F11) blown?  
Be sure to check both fuse and varistor in any case.

Is varistor(NR11) burnt?

Yes → Replace the varistor.



## I Check of outdoor thermistors

Thermistors in the outdoor unit are abnormal.

- Disconnect the connectors CN 641 and CN 642 from the outdoor electronic control P.C. board.  
(Check the characteristics of each thermistor.)

(Defrost thermistor)

Measure resistance between CN 641 [1] and [2].

(Discharge temperature thermistor)

Measure resistance between CN 641 [3] and [4].

(Fin temperature thermistor)

Measure resistance between CN 642 [1] and [2].

- ① Connect CN 641 and CN 642.
- ② Disconnect the connector between compressor and IPM.

Replace the thermistor.

Does the resistance of thermistor have the characteristics on page 55?

Yes → Turn on power supply to indoor unit and press emergency operation switch.

Replace the outdoor electronic control P.C. board.

Does the unit operate 10 minutes or more?

Is LED in the outdoor electronic control P.C. board flashing 5 minutes?

Re-connect the connector.

## J Check of R.V. coil

Heating operation works when cooling is expected.

- If the connector CN 913 is connected or the R.V. coil is open, the voltage occurs between the terminals even when the control is OFF.

Disconnect connector between compressor and IPM.

Turn on power supply to indoor unit, and press emergency operation switch to heating operation.

3 min. after power turns on, is there voltage of 220-240V AC between CN 913 ① and ② on relay P.C. board?

No

Replace the R.V. coil.

Yes

Is there voltage of 0V between CN 912 ① (+) and ② (-) on relay P.C. board?

Approx. 1V DC voltage occurs.

Replace the outdoor electronic control P.C. board.

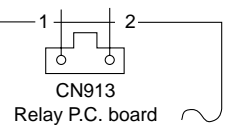
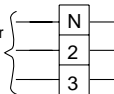
Yes

Replace the relay P.C. board.

Outdoor terminal block TB1

4-way valve AC 220-240V

Indoor-outdoor connecting wire



Cooling operation works when heating is expected.

- First, measure resistance of the R.V. coil to check if it is defective or not.
- If the connector CN 913 is connected or the R.V. coil is open, the voltage occurs between the terminals even when the control is OFF.

Disconnect connector between compressor and IPM.

Turn on power to indoor unit, and press emergency operation switch to cooling operation.

3 min. after power turns on, is there voltage of 220-240V AC between CN 913 ① and ② on relay P.C.?

Yes

- Replace the lead wires of R.V. coil.
- Re-connect connector.
- Replace the 4-way valve.

No

Is there voltage of 1V DC between CN 912 ① (+) and ② (-) on relay P.C. board?

No  
The voltage is 0V

Replace the outdoor electronic control P.C. board.

Yes

Replace the relay P.C. board.

## K Check of outdoor fan motor

Outdoor fan motor does not work.

Disconnect connector CN 771 on relay P.C. board.

Disconnect connector between compressor and IPM.

Turn on power supply to indoor unit, and press emergency operation switch.

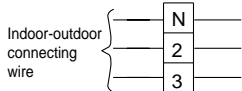
3 minutes after power turns on, is there voltage of 220-240V AC between outdoor terminal block ② and ③?

No

- Press emergency operation switch again to check if 52C relay works.
- Re-connect connecting wire of indoor and outdoor unit.
- Replace the indoor electronic control P.C. board.

Replace the relay P.C. board.

Outdoor terminal block TB1



Yes

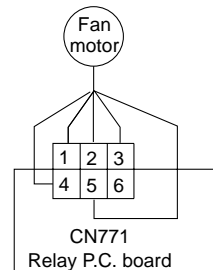
3 minutes after power turns on, measure voltage between terminals of CN 771.

Is there voltage of approx. 220-240V AC either between ② and ③ or between ② and ④ or between ② and ⑤ at CN 771?

No

Yes

- Replace the lead wires of outdoor fan motor.
- Re-connect connector CN 771
- Replace the outdoor fan motor.



(How to check power supply and others)

**L** Check of power supply

Inverter does not work.

Disconnect connector between compressor and IPM.  
Turn on power supply to indoor unit and press emergency operation switch.

3 minutes after power turns on, is there voltage of approx. 220-240V AC between outdoor terminal block **Q** and **N**?

No

- Press emergency operation switch again to check if 52C relay works.
- Re-connect connecting wire of indoor and outdoor unit.
- Replace the indoor electronic control P.C. board.

Yes

Is there approx. 370V DC between both ends of smoothing capacitor (C62) on outdoor electronic control P.C. board?

No

- Main circuit
- Reactor
- Noise filter P.C. board
- Connection of connector

} defective

Yes

Does LED light up or flash on outdoor electronic control P.C. board.?

No

Replace the outdoor electronic control P.C. board.

Yes

Does LED flash or light up on outdoor electronic control P.C. board.?

Light up

Ok

Flash

Repair according to the LED indication.

370V DC

C62



LED

Outdoor electronic control P.C. board

**M** Check of thermal fuse

Unplug the power cord.

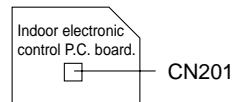
Is resistance  $\infty$  between connector CN 201 **□** on indoor electronic control P.C. board and terminal block **N**?

Yes

Replace thermal fuse.

No

Ok



**N** Check of outdoor electronic control P.C. board

Cooling/heating does not operate. (Speed of compressor rotation does not increase.)

Check the connecting CN911 in the relay P.C. board and CN726 in the outdoor electronic control P.C. board.

Turn on power supply to indoor unit, and press emergency operation switch.

Does the outdoor unit fan operate normally?

No

Check the outdoor fan motor. (Refer to page 46.)

Yes

Check LED indication in the outdoor electronic control P.C. board.

Except 8-time flashing

Check the applicable parts by LED indication.

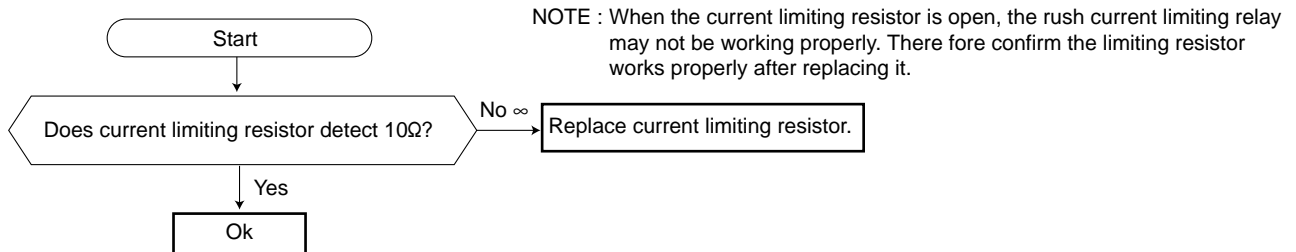
8-time flashing

Converter protect suspension.

Replace the outdoor electronic control P.C. board.

## O Check of rush current limiting circuit

Outdoor unit does not operate or stops immediately due to overcurrent.



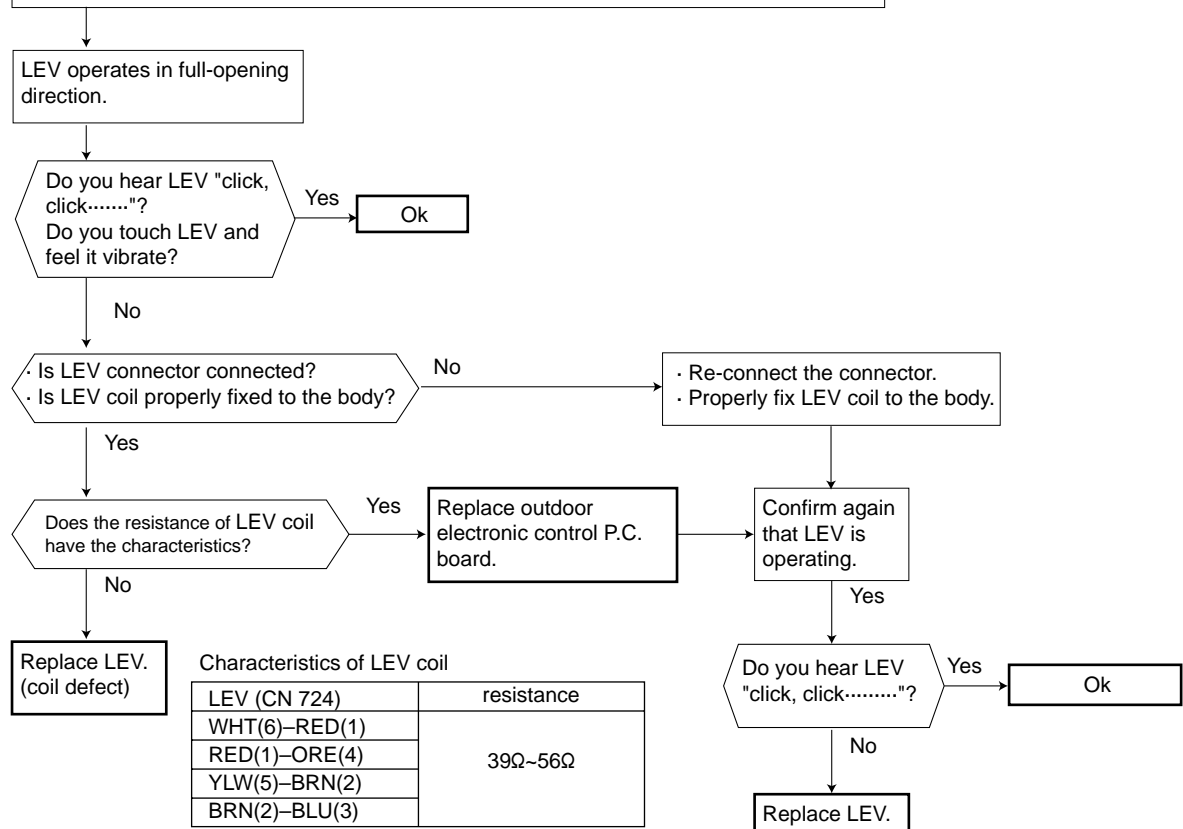
## P Check of linear expansion valve (LEV)

Heating/Cooling do not operate.

✳After you have followed the entire flow chart of "Check of linear expansion valve (LEV)", be sure to follow the procedure below.

- ①Press EMERGENCY OPERATION switch.
- ②Unplug the power cord and then plug it again.
- ③Press RESET button on remote controller.

- Press RESET button, while pressing OPERATION SELECT button on remote controller. (All displays on operational display section are ON.)
- With remote controller set toward the indoor unit, press OPERATE/STOP(ON/OFF) button and confirm one beep tone.
- With remote controller set toward the indoor unit, OPERATE/STOP(ON/OFF) button and confirm two beep tones.

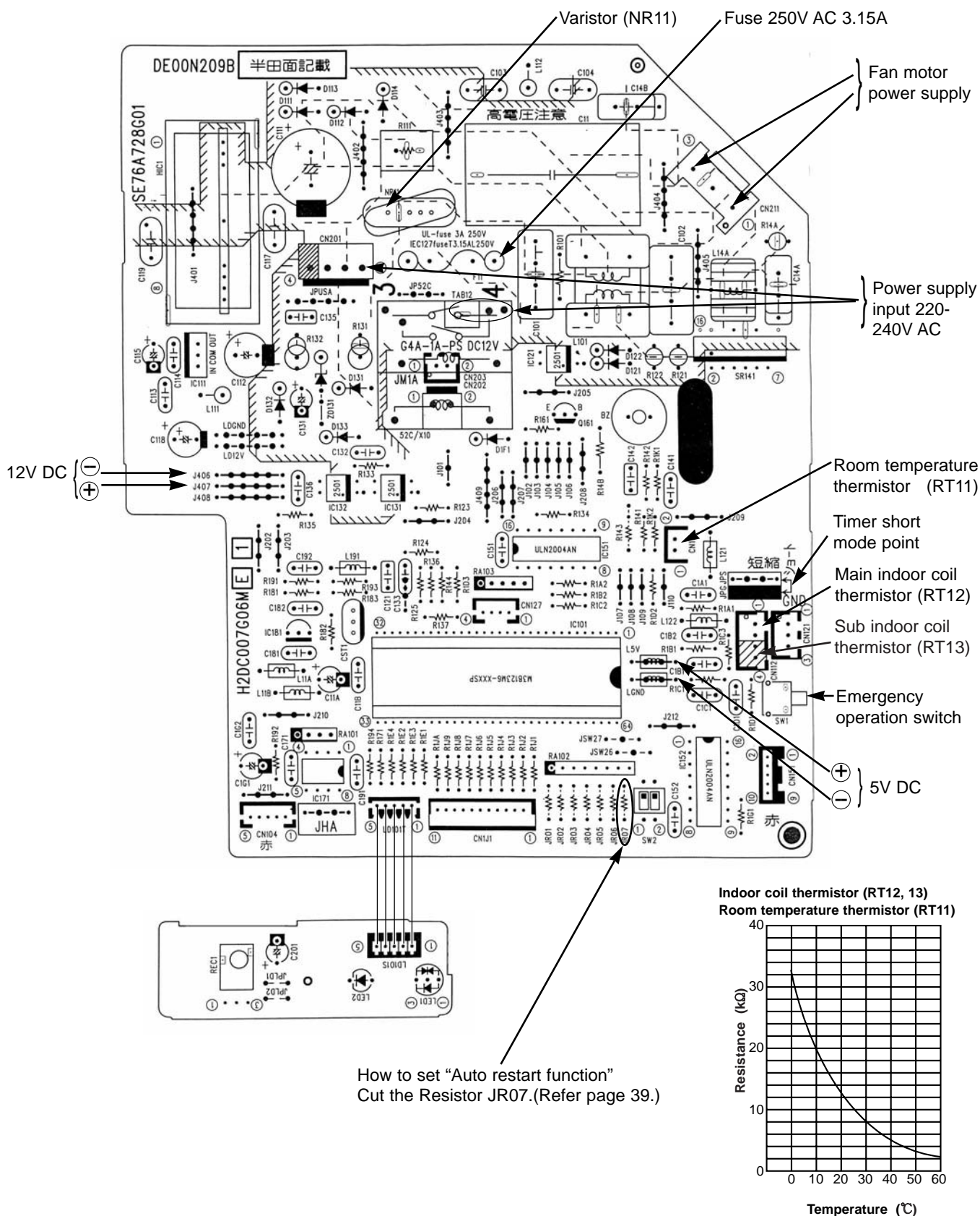


# TEST POINT DIAGRAM AND VOLTAGE

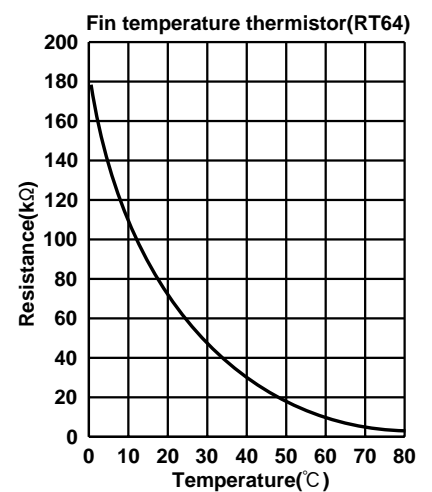
MSZ-A09RV -E1

MSZ-A12RV -E1

Indoor electronic control P.C. board



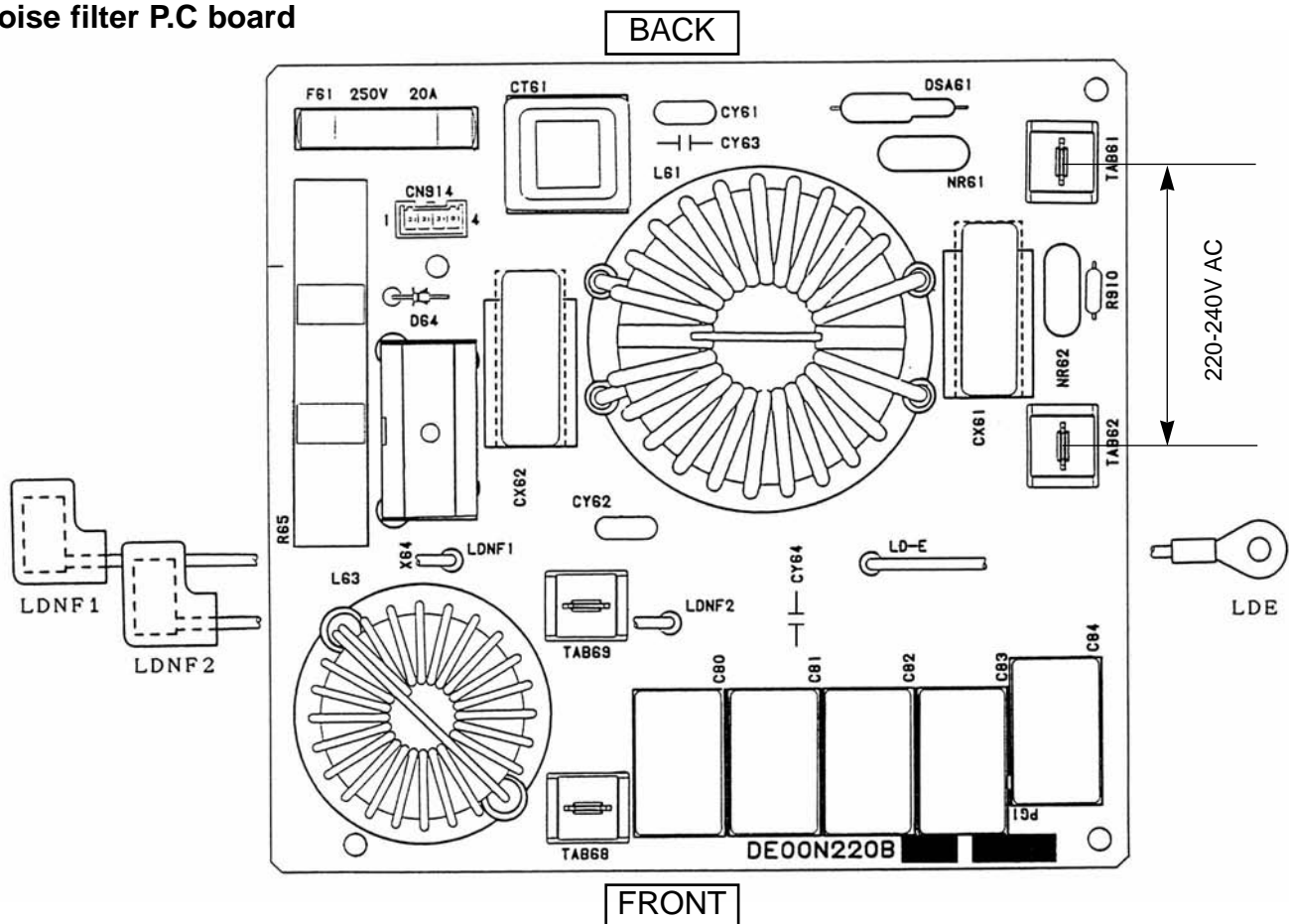
**MUZ-A12RV - E1**



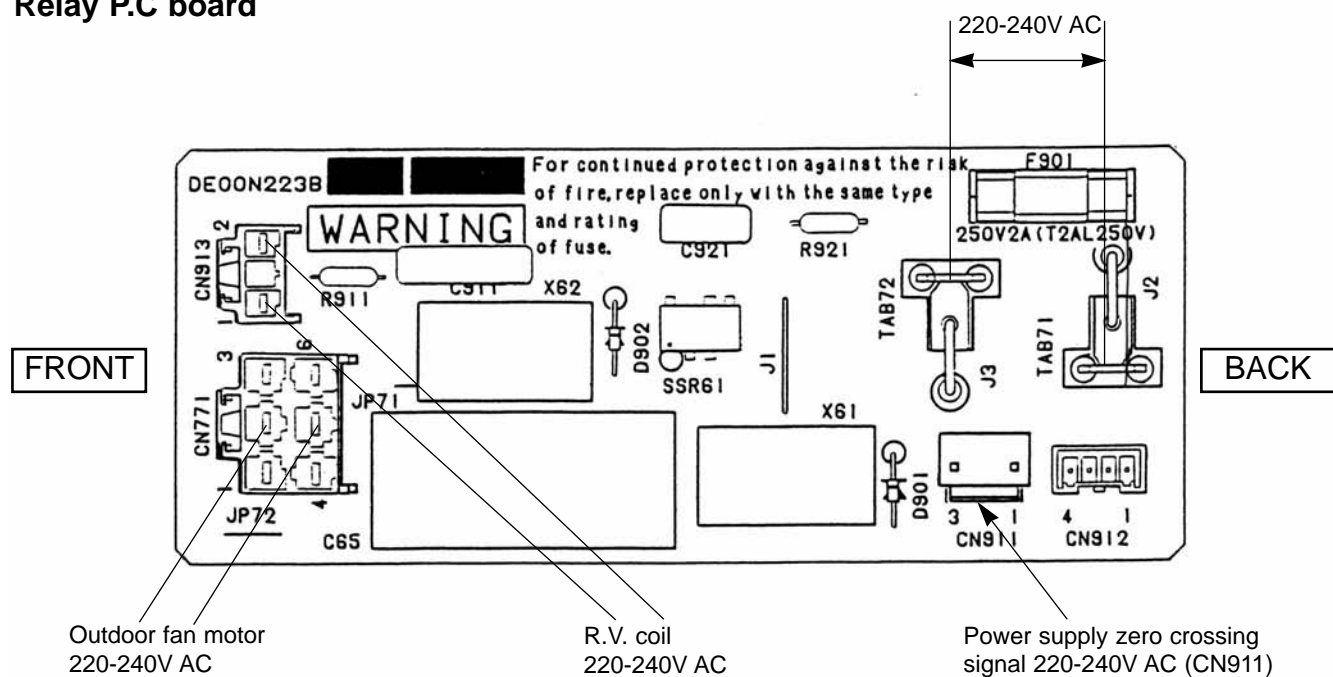
MUZ-A09RV -E1

MUZ-A12RV -E1

## Noise filter P.C board



## Relay P.C board

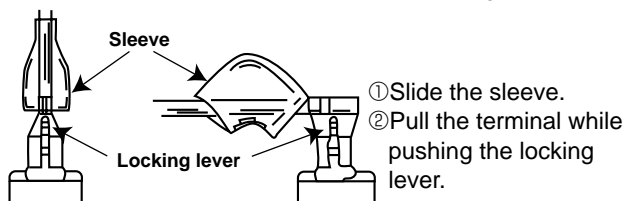




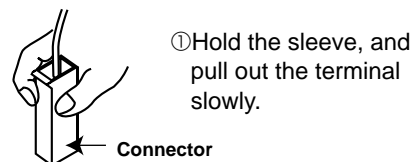
## &lt;"Terminal with lock mechanism" Detaching points&gt;

In case of terminal with lock mechanism, detach the terminal as shown below.  
There are two types ( Refer to (1) and (2)) of the terminal with lock mechanism.  
The terminal with no lock mechanism can be removed by pulling it out.  
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



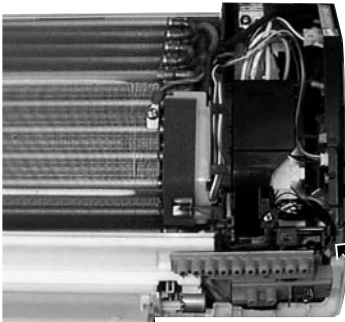
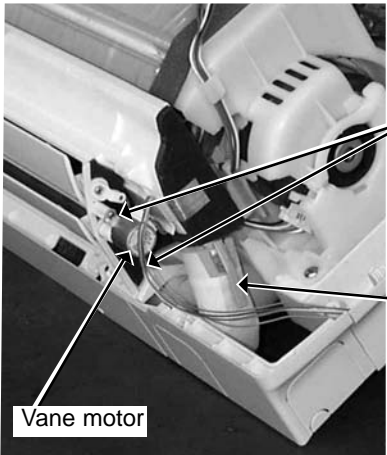
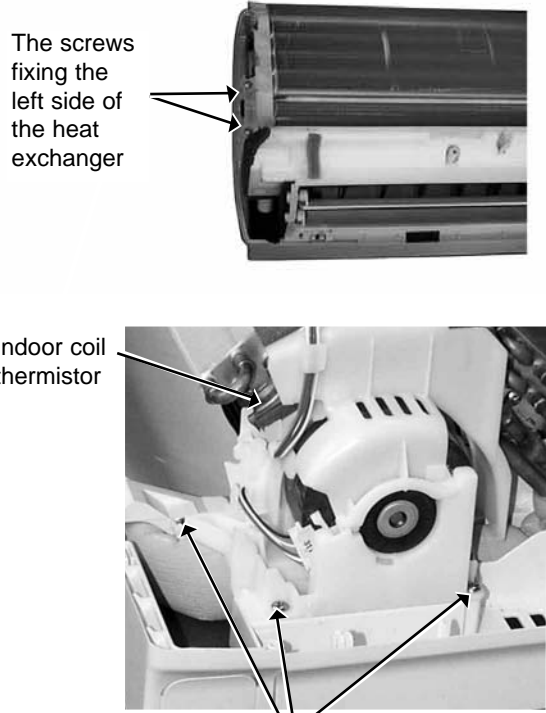
(2) The terminal with this connector is a terminal with lock mechanism.



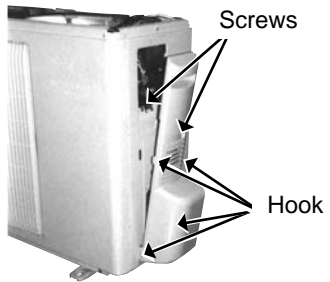
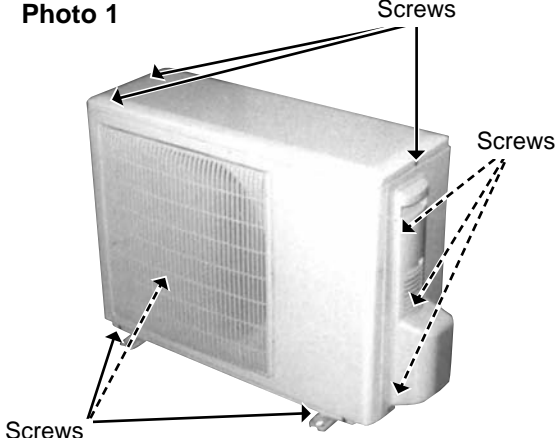
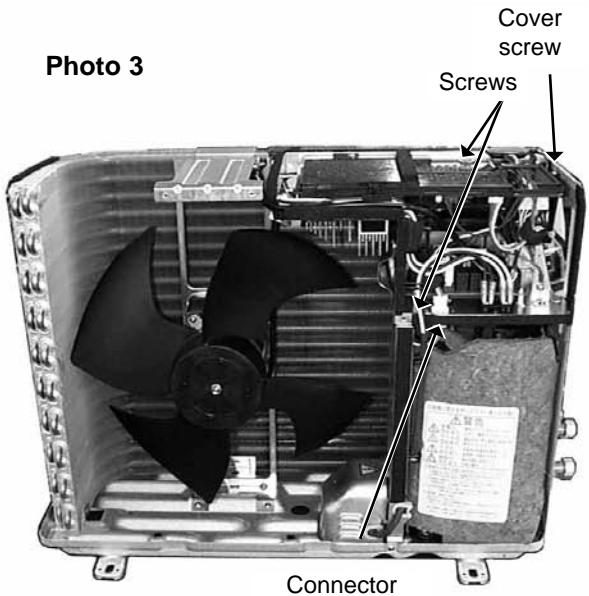
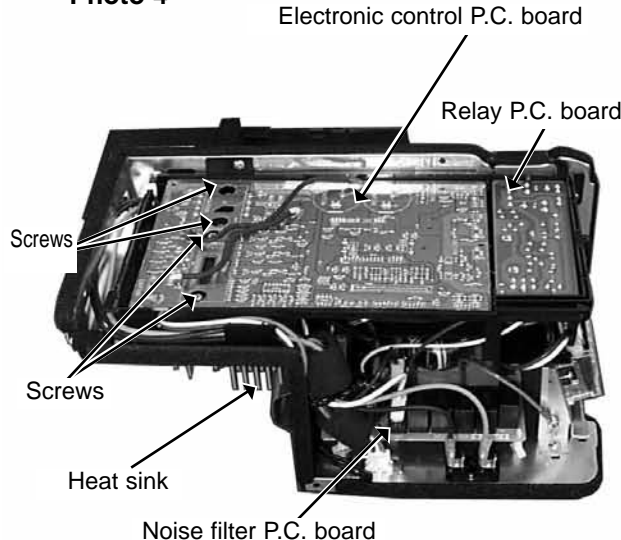
### 12-1. MSZ-A09RV -[E1] MSZ-A12RV -[E1] INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p><b>1. Removing the front panel</b></p> <ol style="list-style-type: none"> <li>(1) Remove the screw caps of the front panel. Remove the screws.</li> <li>(2) Pull the panel down to your side slightly and unhook the catches at the top.</li> </ol>	<p><b>Photo 1</b></p> <p>Front panel</p> <p>Screws</p>
<p><b>2. Removing the electronic control P.C. board and the display P.C. board.</b></p> <ol style="list-style-type: none"> <li>(1) Remove the front panel. (Refer to 1)</li> <li>(2) Remove the screw of the electrical cover. Remove the electrical cover.</li> <li>(3) Remove the terminal cover. Remove the screw of the terminal block.</li> <li>(4) Remove the cord clamp.</li> <li>(5) Remove the screw of the ground wire.</li> <li>(6) Disconnect all the connectors and all the lead wires on the electronic control P.C. board.</li> <li>(7) Remove the electronic control P.C. board and the display P.C. board.</li> </ol>	<p><b>Photo 2</b></p> <p>Ground</p> <p>Fan motor connector</p> <p>Terminal block cover</p> <p>Room temperature thermistor connector</p> <p>Indoor electronic control P.C. board</p> <p>Vane motor connector</p> <p>Cord clamp</p> <p>Terminal block cover screw</p>



OPERATING PROCEDURE	PHOTOS
<p><b>3. Removing the electrical box</b></p> <ol style="list-style-type: none"><li>(1) Remove the front panel. (Refer to 1)</li><li>(2) Remove the electrical cover.</li><li>(3) Disconnect the connector of the indoor coil thermistor.</li><li>(4) Disconnect the motor connector (CN211) and the vane motor connector (CN151) on the electronic control P.C. board.</li><li>(5) Remove the screw fixing the electrical box, remove the electrical box.</li></ol>	<p><b>Photo 3</b></p>  <p>Electrical box screw</p>
<p><b>4. Removing the vane motor</b></p> <ol style="list-style-type: none"><li>(1) Remove the front panel.</li><li>(2) Remove the screws (both upper and lower) of the vane motor, disconnect the connector.</li><li>(3) Remove the vane motor.</li></ol>	<p><b>Photo 4</b></p>  <p>Vane motor screws</p> <p>Drain hose</p> <p>Vane motor</p>
<p><b>5. Removing the line flow fan and the indoor fan motor</b></p> <ol style="list-style-type: none"><li>(1) Remove the front panel. (Refer to 1)</li><li>(2) Remove the electrical box.</li><li>(3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly.</li><li>(4) Remove the screws fixing the fan motor.</li><li>(5) Remove the screws fixing the left side of the heat exchanger.</li><li>(6) Lifting the left side of the heat exchanger.</li><li>(7) Remove the hexagon socket set screws.</li><li>(8) Remove the fan motor, and remove the line flow fan.</li></ol>	<p><b>Photo 5</b></p>  <p>The screws fixing the left side of the heat exchanger</p> <p>Indoor coil thermistor</p> <p>Fan motor screws</p>

## 12-2. MUZ-A09RV -[E1] MUZ-A12RV -[E1] OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
<p><b>1. Removing the cabinet</b></p> <ol style="list-style-type: none"> <li>(1) Remove the screws fixing the top panel and top panel.</li> <li>(2) Remove the screws fixing the service panel.</li> <li>(3) Pull down the service panel and remove it from the cabinet.</li> <li>(4) Remove the screws fixing the cabinet.</li> </ol> <p><b>Photo 2</b></p> 	<p><b>Photo 1</b></p> 
<p><b>2. Removing the inverter assembly</b></p> <ol style="list-style-type: none"> <li>(1) Remove the top panel, the service panel and the cabinet.</li> <li>(2) Disconnect the connectors (CN641),(CN642),(CN601) and (CN724) on the electronic control P.C. board.</li> <li>(3) Remove the connectors (CN771) and (CN913) on the relay P.C. board.</li> <li>(4) Remove the lead wires from the reactor(L64) on the TB2.</li> <li>(5) Remove the screws fixing the relay panel.</li> </ol> <p><b>3. Removing the electronic control P.C. board</b></p> <ol style="list-style-type: none"> <li>(1) Remove the top panel, service panel and the cabinet. (Refer to 1)</li> <li>(2) Remove the cover.</li> <li>(3) Remove all the connectors and the terminals on the control P.C. board.</li> <li>(4) Remove the connector from the compressor.</li> <li>(5) Remove the screws fixing the PFC and IPM.</li> <li>(6) Remove the electronic control P.C. board from the heat sink.</li> </ol> <p><b>4. Removing the relay P.C. board</b></p> <ol style="list-style-type: none"> <li>(1) Remove the top panel, the service panel and the cabinet. (Refer to 1)</li> <li>(2) Remove all the connectors and the terminals on relay P.C. board.</li> <li>(3) Remove the relay P.C. board.</li> </ol>	<p><b>Photo 3</b></p> 
<p><b>5. Removing the noise filter P.C. board</b></p> <ol style="list-style-type: none"> <li>(1) Remove the top panel, the service panel and the cabinet. (Refer to 1)</li> <li>(2) Remove the electronic control P.C. board and relay P.C. board.</li> <li>(3) Remove all the connectors and the terminals on noise filter P.C. board.</li> <li>(4) Remove the ground wire screwed down on the relay panel.</li> <li>(5) Remove the noise filter P.C. board.</li> </ol>	<p><b>Photo 4</b></p> 

## OPERATING PROCEDURE

### 6. Removing the outdoor fan motor

- (1) Remove the top panel, the service panel and the cabinet.  
(Refer to 1)
- (2) Disconnect the connector remove the clamp of fan motor lead wire.
- (3) Remove the propeller fan nut and remove the propeller fan.
- (4) Remove screws fixing the fan motor.

### 7. Removing the compressor

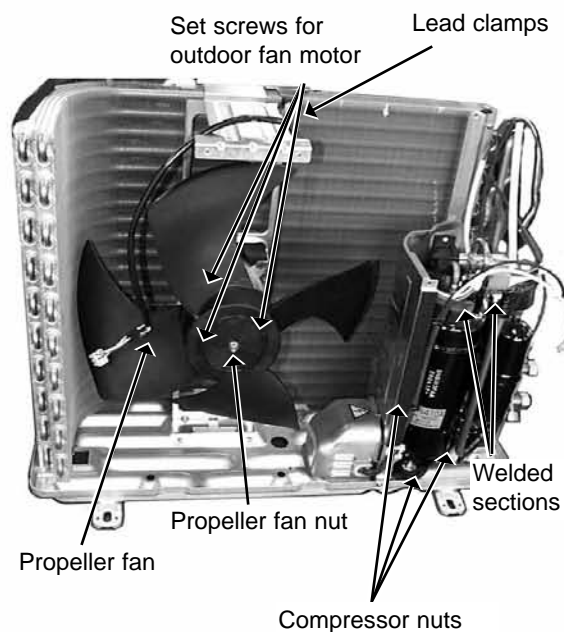
- (1) Remove the top panel, the service panel and the cabinet.  
(Refer to 1)
- (2) Remove the soundproof felt.
- (3) Remove the terminal cover on the compressor.
- (4) Remove the electrical assembly. (Refer to 2)
- (5) Recover gas from the refrigerant circuit.
- (6) Disconnect the welded part of the discharge pipe.
- (7) Disconnect the welded part of the suction pipe.
- (8) Remove nuts fixing the compressor.
- (9) Remove the compressor.

### NOTE

- Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm<sup>2</sup> (0MPa).
- Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.

## PHOTOS

Photo 5



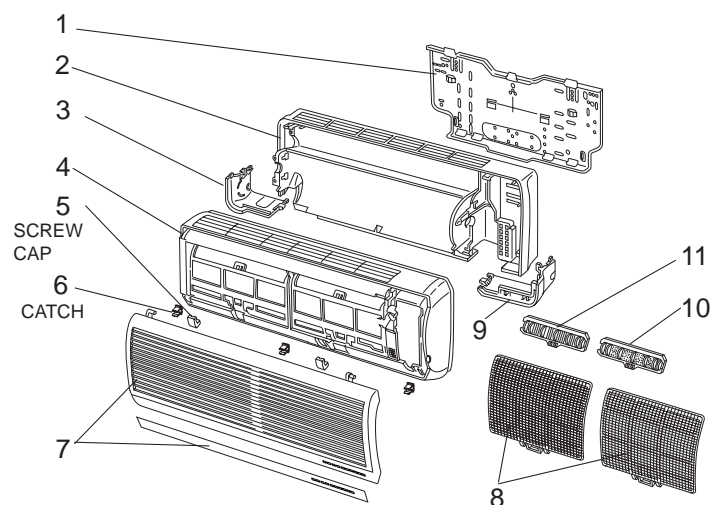
# 13

# PARTS LIST

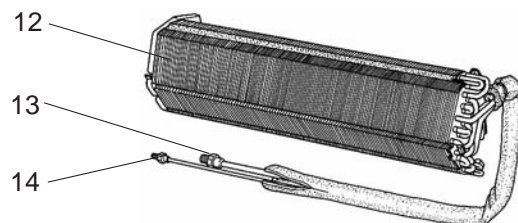
MSZ-A09RV -E1 (WH)

MSZ-A12RV -E1 (WH)

## 13-1. INDOOR UNIT STRUCTURAL PARTS



## 13-2. INDOOR UNIT HEAT EXCHANGER



## 13-1. INDOOR UNIT STRUCTURAL PARTS

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MSZ-A09RV- (WH)	MSZ-A12RV- (WH)	
1	E02 408 970	INSTALLATION PLATE		1	1	
2	E02 411 234	BOX (WH)		1	1	
3	E02 409 976	CORNER BOX LEFT (WH)		1	1	
4	E02 409 000	FRONT PANEL (WH)		1	1	
5	E02 409 067	SCREW CAP (WH)		2	2	2PCS/SET
6	E02 408 142	CATCH		3	3	3PCS/SET
7	E02 409 010	GRILLE (WH)		1	1	
8	E02 410 100	AIR FILTER		2	2	
9	E02 409 975	CORNER BOX RIGHT (WH)		1	1	
10	—	DEODORIZING FILTER		1	1	See page 65. (MAC-1800DF)
11	—	AIR CLEANING FILTER		1	1	See page 65. (MAC-1300FT)

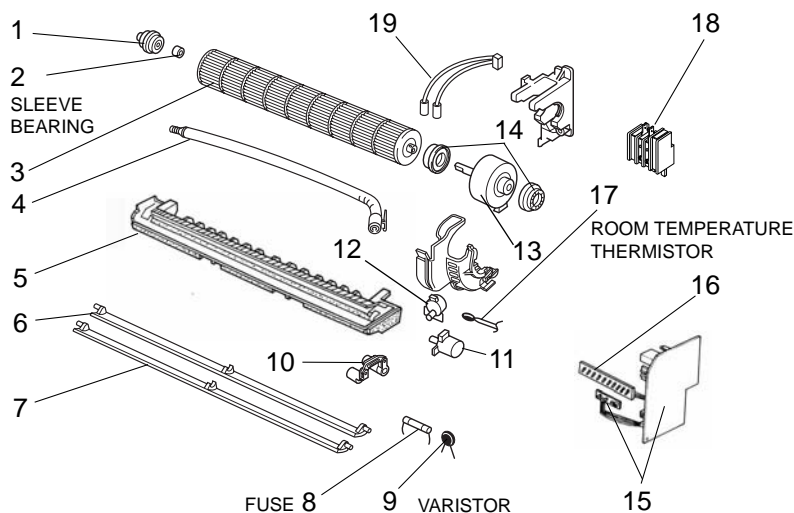
## 13-2. INDOOR UNIT HEAT EXCHANGER

12	E02 448 620	INDOOR HEAT EXCHANGER		1	1	
13	E02 151 666	UNION (GAS)		1	1	φ9.52
14	E02 151 667	UNION (LIQUID)		1	1	φ6.35

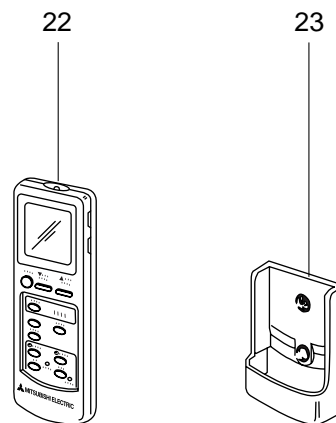
MSZ-A09RV -**E1** (WH)

MSZ-A12RV -**E1** (WH)

### 13-3. INDOOR UNIT ELECTRICAL PARTS



### 13-4. ACCESSORY AND REMOTE CONTROLLER PARTS



### 13-3. INDOOR UNIT ELECTRICAL PARTS

Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MSZ-A09RV- <b>E1</b> (WH)	MSZ-A12RV- <b>E1</b> (WH)	
1	E02 408 509	BEARING MOUNT		1	1	
2	E02 001 504	SLEEVE BEARING		1	1	
3	E02 408 302	LINE FLOW FAN		1	1	
4	E02 408 702	DRAIN HOSE		1	1	
5	E02 448 235	NOZZLE (WH)		1	1	
6	E02 409 040	VANE UPPER (WH)		1	1	
7	E02 409 041	VANE LOWER (WH)		1	1	
8	E02 127 382	FUSE	F11	1	1	3.15A
9	E02 336 385	VARISTOR	NR11	1	1	
10	E02 408 034	VANE CRANK SET		1	1	UP & DOWN
11	E02 408 303	VANE MOTOR (HORIZONTAL)	MV1	1	1	UP & DOWN
12	E02 448 303	VANE MOTOR (VERTICAL)	MV2	1	1	RIGHT & LEFT
13	E02 151 300	INDOOR FAN MOTOR	MF	1	1	RC4V19 - □□
14	E02 151 505	FAN MOTOR RUBBER MOUNT		2	2	2PES/SET
15	E02 448 452	ELECTRIC CONTROL P.C.BOARD		1		AUTO RESTART Including RECEIVER P.C. BOARD
	E02 449 452	ELECTRIC CONTROL P.C.BOARD			1	AUTO RESTART Including RECEIVER P.C. BOARD
16	E02 408 329	GREEN SIGN P.C.BOARD		1	1	
17	E02 408 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	
18	E02 448 375	TERMINAL BLOCK	TB	1	1	3P
19	E02 448 307	INDOOR COIL THERMISTOR	RT12, 13	1	1	
20	E02 448 034	VANE MOTOR SUPPROT SET		1	1	RIGHT & LEFT
21	E02 408 381	THERMAL FUSE	F12	1	1	93℃

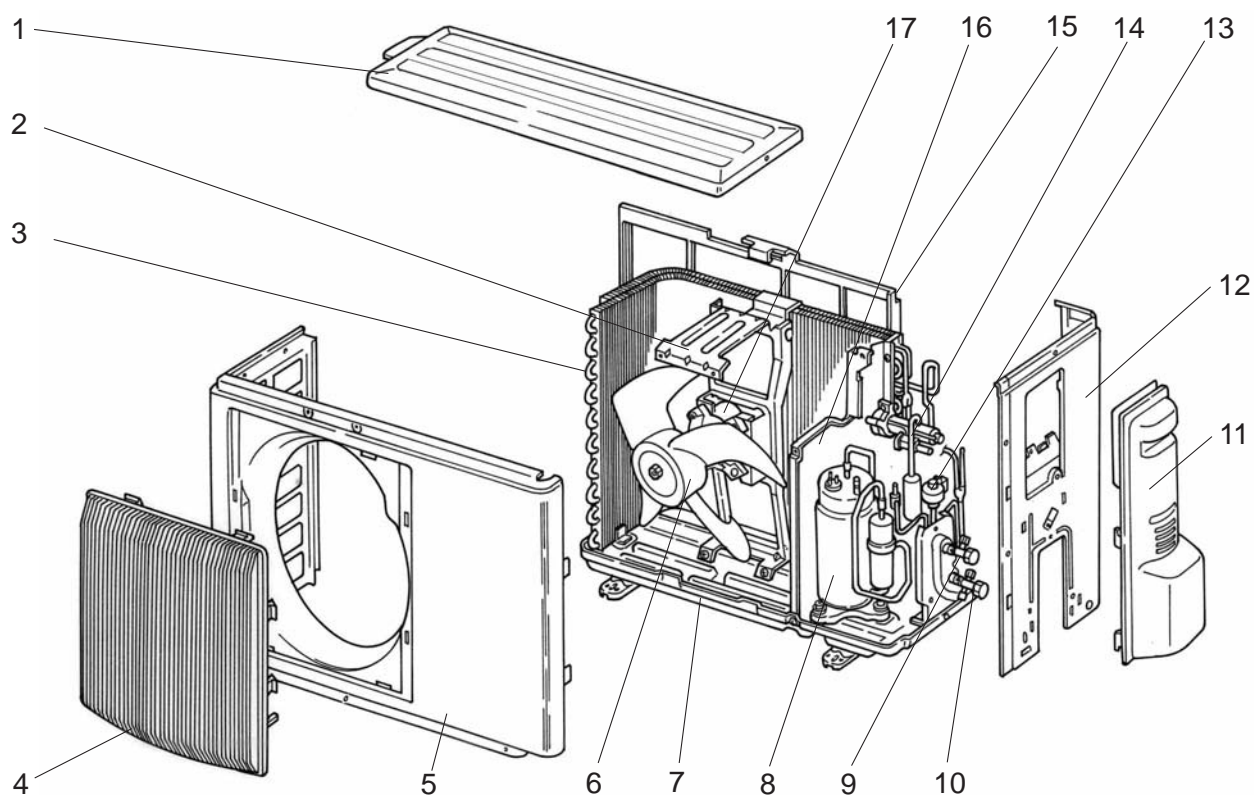
### 13-4. ACCESSORY AND REMOTE CONTROLLER PARTS

22	E02 448 426	REMOTE CONTROLLER		1	1	
23	E02 141 083	REMOTE CONTROLLER HOLDER		1	1	

## 13-5. OUTDOOR UNIT STRUCTURAL PARTS

MUZ-A09RV -E1

MUZ-A12RV -E1



Part numbers that are circled are not shown in the illustration.

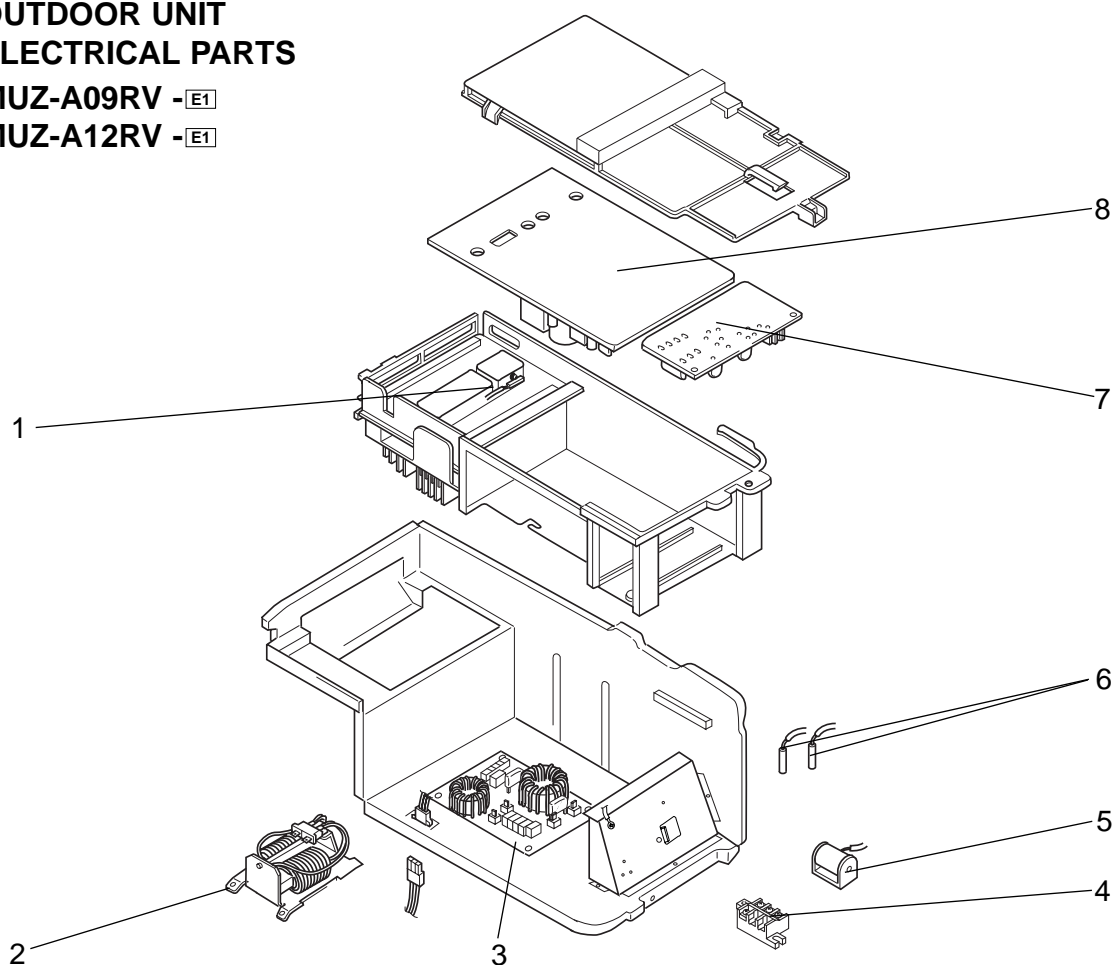
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUZ-A09RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span> MUZ-A12RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span>	
1	M21 75K 297	TOP PANEL		1	
2	T2W E56 515	MOTOR SUPPORT		1	
3	T2W E57 630	OUTDOOR HEAT EXCHANGER		1	
4	T2W E56 521	GRILLE		1	
5	T2W E45 232	FRONT PANEL		1	
6	M21 21J 501	PROPELLER FAN		1	
7	T2W E93 290	BASE		1	
8	T92 510 280	COMPRESSOR	MC	1	SNB092FJAH
9	M21 69A 662	STOP VALVE (LIQUID)		1	φ6.35
10	M21 69A 661	STOP VALVE (GAS)		1	φ9.52
11	M21 40L 245	SERVICE PANEL		1	
12	T2W E56 531	BACK PANEL		1	
13	T2W E56 645	PIPE ASSEMBLY		1	EXP. VALVE, CAPILLARY
14	M21 68V 961	4-WAY VALVE		1	
15	M21 20A 523	CONDENSER NET		1	
16	T2W E56 293	SEPARATOR		1	
17	T2W E56 301	OUTDOOR FAN MOTOR	MF61	1	RA6V28-□□
18	M21 K89 936	CAPILLARY TUBE		2	2PC/SETφ3.0Xφ2.0X300
19	T2W E56 943	MUFFLER		1	
20	T2W E57 943	MUFFLER SPECIAL		1	

When servicing , cut the tube to the proper length as shown in the REFRIGERANT SYSTEM DIAGRAM.  
See page 12.

## 13-6. OUTDOOR UNIT ELECTRICAL PARTS

MUZ-A09RV -E1

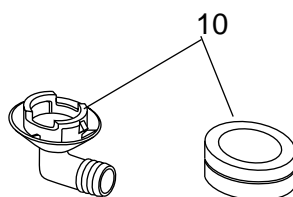
MUZ-A12RV -E1



Part number that is circled is not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUZ-A09RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span>	MUZ-A12RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span>	
1	M21 90A 308	FIN TEMPERATURE THERMISTOR	RT64	1	1	
2	T2W E56 331	REACTOR	L64	1	1	
3	T2W E56 424	NOISE FILTER P.C BOARD		1	1	
4	T2W E45 376	TERMINAL BLOCK	TB1	1	1	
5	T2W E56 389	R.V. COIL	21S4	1	1	
6	T2W E56 309	THERMISTOR SET	RT61,62	1	1	DISCHARGE, DEFROST
7	T2W E56 441	RELAY P.C BOARD		1	1	
8	T2W E56 451	ELECTRIC CONTROL P.C BOARD		1		
	T2W E57 451	ELECTRIC CONTROL P.C BOARD			1	
<span style="border: 1px solid black; border-radius: 50%; padding: 2px;">9</span>	T2W E56 376	TERMINAL BLOCK	TB2	1	1	

## 13-7. ACCESSORY



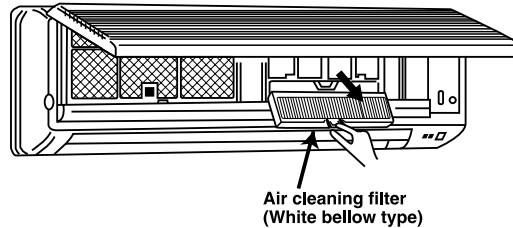
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MUZ-A09RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span>	MUZ-A12RV- <span style="border: 1px solid black; padding: 0 2px;">E1</span>	
10	T2W E71 704	DRAIN SOCKET ASSY		1	1	DRAIN SOCKET 1ps DRAIN CAP 3pcs



### 13-8. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

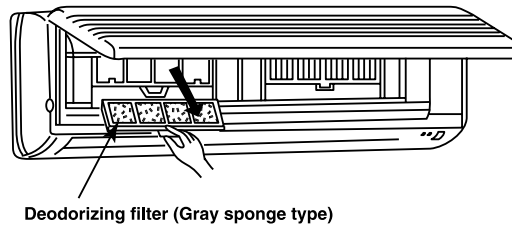
Model	Part No.
<b>MSZ-A09RV</b> - [E1]	MAC-1300FT
<b>MSZ-A12RV</b> - [E1]	



### 13-9. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulfide emitted from tobacco, and odors of pets.
  - Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
  - For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
  - When the filter color is still dark even after cleaning, replace the filter with a new one.
- Replace the filter at least once a year.

Model	Part No.
<b>MSZ-A09RV</b> - [E1]	MAC-1800DF
<b>MSZ-A12RV</b> - [E1]	



- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.



HEAD OFFICE: MITSUBISHI DENKI BLDG.,2-2-3, MARUNOUCHI, CHIYODA-KU, TOKYO100-8310, JAPAN

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